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ABSTRACT

The educational specifications of facilities for rural Alaskan schools are given in this 1964 report. Alaska's 6 recognized geographic regions are briefly described with consideration to topography, climate, permafrost conditions, latitude position, and transportation difficulties which present problems in planning schools. Since the school design should be able to accommodate recent trends in teaching methodology and any future developments, space requirements, as well as how instructional programs relate to space, are discussed. Facilities for small, isolated elementary schools, which should be flexible and functional buildings, are described as they relate to kindergarten, primary, intermediate, upper, and special education programs in Alaska. This report presents activities and learning experiences which have implications for construction and space and the current teaching methods used. Also given are the specifications for Alaskan teachers' living quarters. Alaska's rural high schools are discussed in terms of the educational program, learning environment, and special facilities needed. Suggested space and equipment allocations for schools of various sizes, the elementary classroom-teacher cluster, and the orientation with high schools are illustrated. (NQ)

Alaska. Education Dept. Public Information and Publications Office.
Educational specifications for rural Alaskan Schools.

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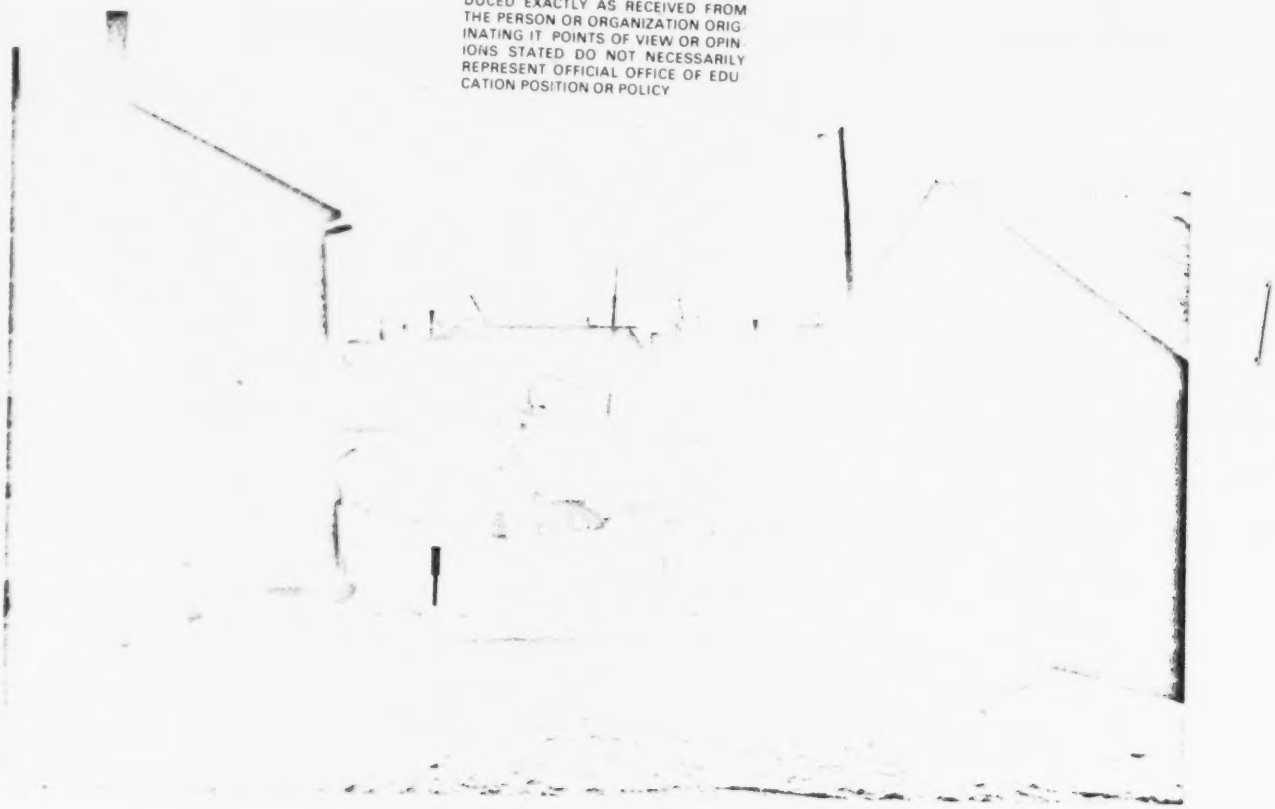

Rural Alaskan Schools

EDUCATIONAL SPECIFICATIONS

alaska department of education

Educational Specifications
RURAL ALASKAN SCHOOLS

Dr. Marshall L. Lind
Commissioner of Education

Office of Public Information and Publications
Alaska Department of Education

Reprinted September, 1971

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EDUCATIONAL SPECIFICATIONS
FOR
RURAL ALASKAN SCHOOLS

Sponsored by

Educational Facilities Laboratories, Inc.

A Joint Report

Coordinated by

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The School Planning Laboratory, School of
Education, Stanford University, Stanford, California

and

The Educational Planning Service of
Colorado State College, Greeley, Colorado

July 1, 1964
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FOREWORD

This report, Educational Specifications for Rural Alaskan Schools, is the result of an extended, careful assessment of educational problems and requirements which inhere in the isolated areas of Alaska.

Many educational specialists -- far too numerous to identify individually -- have contributed. Not only have the competencies of many been brought to bear, but the unique knowledge and perception of a wide array of backgrounds have contributed importantly. Anthropologists, sociologists, and political scientists -- all specialists in their own right -- have added measurably to an understanding and analysis of needs which exist.

The contributions of these people have been supported by extensive personal visitation of other specialists to Alaska, by many personal conferences, and by data gathering inquiries and extensive correspondence.

It is the hope of the two agencies which have collaborated that this Report will lead to improved educational opportunities and progress for the children of the isolated, rural areas of Alaska.

The School Planning Laboratory
School of Education
Stanford University

The Educational Planning Service
Colorado State College (Greeley)

July 1, 1964

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I. PLANNING FOR ALASKAN SCHOOLS

A meeting was held in Anchorage, Alaska, late in 1961, at which representatives of the Alaska State Department of Education outlined their needs in terms of assistance in educational planning to staff members of Educational Facilities Laboratories, Inc. The following research activities were agreed upon:

1. Educational Specifications for Rural Elementary Schools
2. Educational Specifications for Rural High Schools
3. Educational Specifications for Comprehensive Boarding High Schools
4. General Specifications for Living Quarters for Teachers

Many problems associated with rural education were presented at the conference. Several rural teachers described their problems, which included insufficient heat, frozen toilets, inadequate quarters, and high living costs.

Subsequent visits to Alaska during all seasons of the year by EFL staff members resulted in delimitation and definition of planning objectives in keeping with the four needs outlined above. Recently, the third need was judged of limited immediate value, and has been deleted as a planning task.

Introduction

An outstanding educational system is the aim of Alaska, its educators and citizens. Alaskan people, in common with others, view good schools as the means to a good life and the maintenance of human liberty.

Population sparsity and remoteness of many villages, difficult terrain, harsh climate, and other problems present special difficulties to attaining educational objectives in Alaska, but these do not constitute insurmountable

difficulties. The intellectual development, and the ability of pupils to think and act according to high standards of ethics and morality are historic aims, which are being increasingly realized. Education in Alaska is improving! But it is not a finished task; added effort is needed to achieve further improvement and to reach desirable goals.

Toward such ends proper school planning is required and demands priority attention. Such planning must provide intelligent consideration of immediate and long-range needs; it must be carried out in a sound, rational way. Such an approach is not only logically sound, it also is economically necessary.

The task of this report is to assist Alaska in developing basic standards for planning its educational development. Concepts presented here postulate the following objectives of Alaskan public schools:

> Providing the opportunities for every child to receive an education commensurate with his ability.
>
> Developing competencies necessary to meet all the demands of society.
>
> Preparing the student for responsible citizenship, and wholesome appreciation of cultural values.

The success of any planning task, whether connected with schools, business, or general government, is predicated upon the work of involved individuals. Thus, in the final analysis, the challenge to improve Alaskan education rests with her people.

Bridging the Cultural Gap

In considering the over-all objectives the writers of this report have recognized an important complicating factor. This is the cultural gap between many of the children to be educated and the adult society which these children

will enter. While this problem is by no means unique to Alaska, it exists on a larger scale than in many of the other states of the Union.

Small rural schools have been proposed to serve the needs of children living in isolated regions. These are native children for the most part, coming primarily from one of four cultural patterns, Tlingit, Athapascan, Northern Coastal Eskimo, and Southern Coastal Eskimo. These cultures have different formal institutions and varying degrees of exposure to Caucasian commercial culture. It is these cultural patterns that have molded the raw material with which the schools will work.

What shall the end product of formal education be? This is a value question about which difference of opinion exists. In general, however, the schools will produce graduates who must be able to compete in the standard American commercial culture. Anthropologically speaking, the cultural gap must be bridged since the native cultural patterns are being forced to give way to the dominant commercial pattern. Indeed, bridging this gap may represent the most important single challenge to Alaskan education.

What is prepardedness for competition in the dominant American cultural pattern? Graduates of secondary schools in most states have had experiences which Alaskan natives for the most part have not had:

> A study of institutions and economic systems of the contemporary western world, from the simplest to the most complex.
>
> A number of years of formal and informal training in the development of a vocabulary for effective communication.
>
> An exposure to the attitudes and values of a middle-class oriented society.

How can schools help native youngsters achieve this preparedness? Certainly not by simply providing technical training for specific occupations,

or even by preparation for college, however valuable such programs may be. In fact, before such programs can be really helpful, the schools must help each native student to:

1. Develop a vocabulary which will have immediate communication utility in American society.
2. Become aware of what happens when cultures are absorbed (i. e., the development of different institutions, economic patterns, class structures, and value systems) from the level of their heritage to that of the society into which they are being assimilated. This must not be done by sacrificing existing cultural appreciation, language, and other desirable facets of the heritage.
3. Relate all concepts taught to the everyday pattern of living with which he is familiar as well as to the dominant values and processes of the generalized American culture.

The successful teacher of Alaskan native youngsters, in order to help them bridge the cultural gap, must possess certain essential characteristics. These include a willingness to accept each student as an intelligent human being, and to understand his attitude and value system; a knowledge about and appreciation for different cultural patterns; a thorough subject matter knowledge to enable relating various facts and concepts to the local environment (both physical and cultural); and a thorough understanding of the development of American culture so as to help students relate their past experiences to the culture they are preparing to enter.

While we offer no detailed proposal for bridging the cultural gap through education, we stress the importance of this task for the primary purpose of demonstrating that equality of educational opportunity does not necessarily imply identity of educational experiences or programs.

Challenges to be Faced

The awe inspiring geography of Alaska results in school planning problems which are as equally impressive. Fiscal issues and difficulties act to increase, not minimize, the challenge.

Physical and geographic factors requiring special consideration are topography, climate, permafrost conditions, and latitude position. Each of these will be considered to illustrate its effect upon school construction. For descriptive convenience, the six recognized geographic regions are used as an analysis framework.

Topography. Most of Alaska consists of rugged mountains, high broad plateaus, and extensive swampy tundra plains. The landforms are so varied that it is impossible to discuss this factor in detail. Suffice it to note here that somewhat more consideration than usual must be given to landforms in determination of school sites. Most population concentrations, however, are in areas of low relief; school site locations may follow generally applicable principles of determination.

Climate. The climate of Alaska demands careful consideration in school plant planning.

Climate of the southeastern portion is similar to that of Baltimore or Philadelphia; the western area is comparable to New England; and the interior to Montana and the Dakotas. Building considerations must be guided not only by average temperature, but by the extremes. Proper insulation is necessary. Prevailing wind direction deserves special consideration. Heavy precipitation in certain areas, together with salt-air accumulation, should be taken into account in selection of building materials. In many areas double doors and porches for removing outside type clothing and boots may be needed. Exterior walls must be easy to maintain because in certain areas there are only a few days

during several months when suitable painting and maintenance weather occurs.

Permafrost. Permanently frozen ground is a characteristic of much of Alaska, especially the Arctic slope and northern Seward Peninsula. The southern Seward Peninsula, the Yukon Flats, the middle Tanana Valley, and the upper Kuskokwim Valley are in a discontinuous permafrost zone. The Bristol Bay region lies in the sporadic-permafrost zone, and the Kenai lowland and Southeastern Alaska are in the no-permafrost zone.

While permafrost condition is a product of latitude, it is also related to subsurface drainage and surface protection. Permafrost usually lies at shallowest depth in areas mantled with peat, organic silt, or a dense mat of living vegetation; it is at greatest depth beneath exposed gravel or bedrock.

Sites must be chosen with care in permafrost areas. Buildings constructed without adequate provision for this condition may sag or buckle, necessitating costly repair. Selection care may result in location of non-permafrost sites in localized permafrost areas.

Latitude. Alaska's proximity to the North Pole is comparable to that of Scotland, Norway, Finland, or Sweden. As a consequence of this, during the winter the hours of daylight are short, or almost non-existent. Conversely, daylight hours are very long during the summer.

Regional Geography

Specifications for Alaskan schools must recognize and provide for its varied geography. An understanding of topography, climate, and certain aspects of both climate and soil is needed.

Since Alaskan geography is so varied, a brief description of selected areas will be noted:

Southeastern Alaska. This area comprises the narrow strip of mainland

lying between Canada and the sea and the Alexander Archipelago Islands. For the most part it is extremely mountainous, and the rugged coastline is indented with fiord-like waterways.

Its climate is equable, having mild winters, cool summers, and heavy precipitation. In some sections the average annual rainfall exceeds 150 inches; it is about 82 inches at Juneau. The average Juneau temperature in January is 28 degrees, and in July is 57 degrees. In a different frame of reference: the growing season is about 160 days in southeastern Alaska.

South-central Alaska. This region comprises Prince William Sound and the Cook Inlet sections of the southern coast, and extends inland to the crest of the Alaska Range. Along the coast of Prince William Sound the topography is similar to that of southeastern Alaska. The inner coastal lowlands of Cook Inlet has less varied topography.

The climate varies from temperate in the coastal area of southeastern Alaska to the extreme continental climate of the interior. Homer, on the Kenai Peninsula, has maximum summer tempeatures ranging between 55 and 65 degrees. Winter daytime temperatures are low, usually ranging between 5 to 20 degrees above zero. The growing season at Homer is 104 days, and precipitation approximates 24 inches yearly. Anchorage is not dissimilar; it has 14 inches of precipitation and a growing season of 110 days. The average temperature there in January is 11 degrees; in July, 57.

Interior Alaska. This includes the drainage basins of the Yukon, the Tanana, the Copper, and Kuskokwim Rivers. It extends from the northern border of the Alaska Range to the southern border of the Brooks Range and to the lower Yukon River on the west and eastward to Canada. While mountainous in places, the area is not generally characterized by rough topography.

The climate is more variable than that of the costal area, being marked by

very cold winters and short, warm summers. Fairbanks' average temperature in January is 12 degrees and July is 60. Fairbanks' recorded temperatures have ranged from a 99 degree maximum to a low of -66. Precipitation averages 12 inches, and there is an 89 day growing season.

Southwestern Alaska-Bristol Bay includes the Bristol Bay area, the lower Kuskokwim and Yukon Rivers, the Alaska Peninsula, and the Aleutian Islands. Topography is rugged.

The area has wet, foggy summers and cold, moist winters. Dutch Harbor in the Aleutians receives 57 inches of precipitation and has a 145 day growing season. Its January average temperature is 32 degrees; July averages 51.

Northwestern Alaska encompasses the Seward Peninsula, the northern portion of which is composed of lowland areas interspersed by rolling uplands and mountains. The southern area consists of rough uplands although lowlands extend along much of the coast, and penetrate inland along several large streams. The entire area has a cold climate with short summers and long frigid winters. Extreme temperatures have ranged from 85 degrees to -60. Winters usually are dry with clear weather, but intense storms accompanied by high winds and precipitation are frequent. Summers are cool and moist; a low overcast and drizzle are common. Nome receives 18 inches of precipitation and has a 52 day growing season. The average January temperature is 3 degrees, and that of July is 50.

Arctic Slope. This comprises the area north from the Brooks Range to the Arctic Ocean. It is quite flat and treeless, and has meandering streams. Long, cold winters and short, cool summers prevail. Barrow receives 6 inches of precipitation yearly. The January average temperature is -17 degrees; July's is 40.

Transportation

Geography, climate, soil, and permafrost conditions all affect transportation in Alaska to a marked degree. Transportation is generally underdeveloped, and in large areas is either primitive or non-existent. Access to much of Alaska is by air or water only.

Spring and early summer are the best flying seasons. During winter months it may be impossible to move supplies or equipment for periods of a month or longer.

This has special implications for education. In remote areas without roads, structures of light weight and which are portable deserve planning consideration. Units which may be shipped in sections and assembled by unskilled labor would help cope with problems induced by transportation difficulties.

Equipment must be dependable because of poor replacement services. Orders for supplies and equipment for the school at Bettles, for example, must be ordered from Seattle during February for late summer receipt.

It is necessary that the planning of facilities take into account the placement of structures in relation to available transportation routes, to keep freight costs from being prohibitively costly. Freight charges in some cases are many times the original cost of the supplies. Anaktuvuk Pass, for example, depends upon fuel oil for heating classrooms and teacherage. Only two or three drums of oil can be delivered at a time by plane because of the poor landing field. Seventy-five drums were delivered to Anaktuvuk Pass for the 1960-61 school year at a cost of $6,300!

Meeting the Challenge

Geographic facts require new approaches to the use of instructional materials and personnel. Because of the sparsity of population, enrollments

in most isolated schools will be quite small. Economic factors may preclude staffing every school (especially high schools) with a full complement of qualified teachers (particularly the specialists required), and equipping every school with a complete supply of books, audio-visual aids, and laboratory equipment.

Two alternatives are available.

One is simply to eliminate parts of the educational program, thus reducing material and personnel needs. This alternative would deny the rural student an education comparable to that offered in more populous areas. A second alternative is to develop a central pool of resources which can be dispersed either on call or on a set distribution schedule. The latter concept underlies the bookmobile idea now commonly used in many parts of the nation.

For example, film series (such as the Baxter chemistry or White physics films), language record series, programmed texts in mathematics and English, and even elementary science demonstration kits could be centrally housed and distributed to schools on a rotation basis for from one week to a few months use. This approach could reduce the costs of purchasing specialized materials, yet make them available to all students. Air transportation could make this arrangement educationally feasible.

Similarly, teaching specialists (e.g., teachers of science, music, or art) can comprise a central pool, serving a number of schools on a rotating schedule. This approach to the use of teaching time is educationally sound once we recognize that time allotments for various subjects do not need to be spread throughout an entire year. A science course offered three or four hours a day for ten weeks, for example, would meet presently defined time requirements at the secondary level. Thus a qualified science teacher could serve three or

four schools in a year instead of just one. This approach, applied successfully in other states, would permit the offering of a comprehensive program with a limited number of qualified personnel.

Intensive courses taught by "circuit teachers" might follow the completion of programmed text materials on an independent study basis. The student would use the programmed materials much as he would take a correspondence course, with the advantage of immediate evaluation of his step-by-step progress. The "circuit teacher," however, would further improve the quality of learning by providing specialized guidance to the student. This approach could permit the more efficient use of teacher competence and time.

Finally, the efficient and effective dissemination of information through television can bring the teaching specialist into the isolated school without actually moving the teacher. This should be considered for Alaska's rural schools. While educational television may not seem feasible in Alaska today, two-way television, linking isolated homes with rural schools, has been a reality in Australia for more than a decade. With the rapid improvements in space satellites for world-wide telecasting, educational television will become increasing practicable, both technically and economically, even in the remotest regions. Meanwhile, two-way radio communication (which can also establish a link between teacher and student) is already feasible. Its potential educational advantages should receive serious consideration.

Each of these approaches departs considerably from our traditional concept of the small town or urban American school. The fact remains, however, that students in isolated regions are entitled to the same quality of education as those more favorably located. The school in the isolated village cannot provide this quality of education, however, by applying traditional methods of scheduling

time and resources. These traditional methods are neither educationally sound nor economically feasible in the small isolated school. The solution of educational problems for Alaska's rural schools, therefore, requires fresh approaches, approaches which call for considerable flexibility and adaptability in physical facilities.

Somewhat similarly, uncommon approaches to facilities are indicated, particularly to cope with economic exigencies. Thus, it is urged that, in spite of the separate educational specifications provided in this report, when enrollments are low, facility planning should be done for the 1-12 grade program, and provision made for sharing of facilities by all pupils.

II. SMALL, ISOLATED ELEMENTARY SCHOOLS

I. Introduction

What happens to the child in the elementary school is of crucial importance. Here the pattern is set for his entire educational experience. Here, too, skills are developed and habits formed which strongly influence his entire life pattern.

Competencies in reading, communicating, thinking, and analyzing have their beginning. The ground-work is laid for recognizing, facing, and solving problems. Preliminary understandings of the physical and social environment, and interdependence of people are sought. Early appreciation of and participation in democratic procedures are initiated. Each of these competencies is developed from skills, based upon wholesome habits, supported by proper attitudes.

Today's elementary schools and their classrooms are thus much more than traditional "academic-centered" learning places. They are centers for physical, social, emotional, and moral -- as well as mental -- development of children.

Many learning activities must be carried out in each classroom. Moreover, they must be carried out in many ways. Not only must schools serve these requirements, but they must be able to meet many new needs. Undoubtedly a variety of new devices, approaches, and techniques will be at the disposal of schools during the next few years. This emphasizes the necessity for increasingly efficient school programs adapted to changing conditions. But programs cannot function in a vacuum; they must be housed in flexible and functional buildings designed for both the present and future.

Helping provide such facilities is the objective of these specifications for small, rural, elementary schools for Alaska.

The challenge and the need are unusually critical in Alaska. As your Commissioner observed in June 1962:

> "More Alaskan children should go to school longer. Three-fourths of the native children never enter high school."

It may be true that some are, in effect, denied the opportunity to continue their schooling, due to circumstances of population, climate, and geography. Yet, little can be done at advanced levels without an adequate background. A sound elementary background, plus encouragement to continue in school are needed, and will help. Without this it will be difficult, if not impossible, for children to develop into effective, self-supporting, contributing citizens.

The usual American instructional arrangement of pupils is not now, and may never be, applicable to many Alaskan elementary schools. Yet, unless the useful arrangements for learning are recognized, and buildings planned for their accommodation, both flexibility and functionality are denied. For this reason, adaptability to five divisions of elementary education should be contemplated in planning classrooms. Space for kindergarten, primary, intermediate, upper, and special education programs should be kept in mind in designing space for learning.

Kindergarten. There is no kindergarten program now, nor is one presently contemplated. Yet, at some future date a full school-year, regular program may become desirable and feasible.

Kindergarten is designed to familiarize children with school procedure, in getting along with other children, developing readiness for learning, and beginning the learning activities. Because many activities are carried on,

considerable area and space flexibility are essential.

The Primary Grades. Space should facilitate pupil grouping arrangements ranging from individual instruction to provide for up to ninety (for teamed instruction) should school populations grow.

In the first three grades, children learn the basic skills of observing, listening, speaking, reading, writing, and numerical abstraction. This forms the basis for all future learning. The immediate world of the pupil forms the basis for understanding of the larger context of history, geography, and his relationship to society. Emphasis is placed on developmental physical education activity, accompanied by exploration of physical health. Science is conceived as an explanation of the phenomena of our environment. Music and art offer opportunity for self-expression about experiences with the known environment.

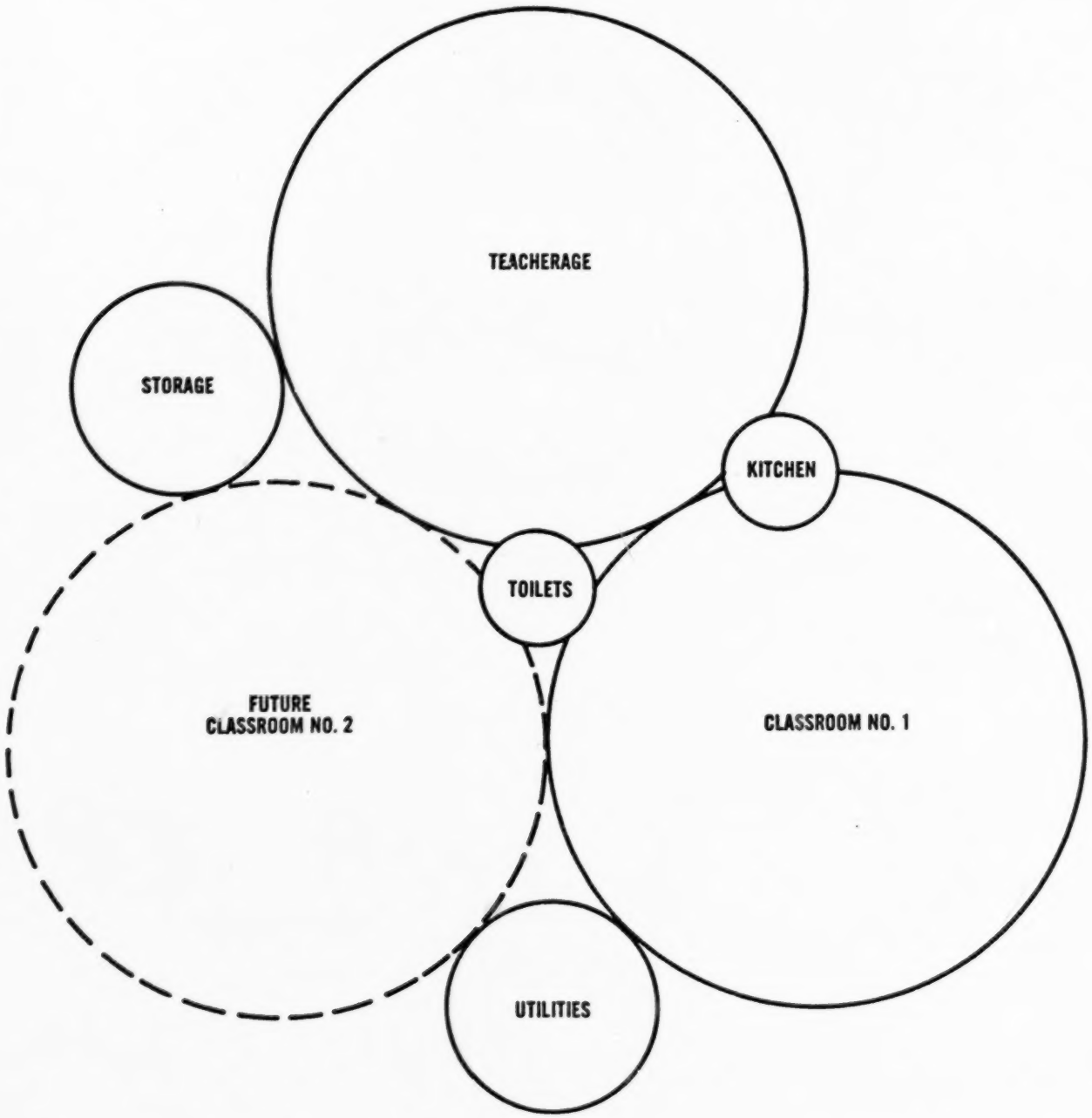
The Intermediate Grades. Grades four, five, and six are the years when concepts identified in the primary grades are explored, developed, and amplified.

This is a developmental period, during which information and materials of increasing quantity and complexity are presented to pupils. The child is more physically and mentally mature and has the initial preparation to project himself at an abstract level into the world of knowledge and ideas. Problem solving assumes greater importance in the development of the thinking process.

There must be strong commitment to the meeting of individual student needs. To facilitate this, the possible utilization of the teachers' areas of specialization for team-teaching and perhaps televised instruction should not be overlooked.

Upper Grades. The program of the intermediate grades is continued, but on a more demanding basis. Here, too, consideration needs to be given to articulation between the elementary and secondary programs.

Special Education. Concern for the atypical, as well as the normal student is expressed when special programs for the former, with accompanying special facilities, are developed. Classrooms are of the approximate size of standard ones, but fewer pupils (12-15) are assigned to them. Crafts activities play an important part in the curriculum, and children seldom work as an entire class on any activity.



ELEMENTARY
CLASSROOM-TEACHERAGE CLUSTER

II. Program Implications For Learning Space

A treatment of all specific activities and learning experiences of children at the various levels would be voluminous. Providing this is beyond the scope of this report. Accordingly, only those aspects with implications for construction and space are presented here. Current teaching methodology used to implement the activity is identified, because this, too, has space implications.

LEARNING ACTIVITIES	TEACHING METHODS
Language Arts	
Reading	
Completion of readiness workbooks and sheets by children with class attention to teacher direction.	The Primary Reading program is typically taught in the self-contained classroom with different size groups, as follows:
Chart work in which teacher relates to a small group or to the whole class in writing stories about pupil experiences, or elaborations of stories from readers.	Readiness - may begin with entire class, but there will be few (if any) pupils who are not reading at year's end.
Storytelling and picture stories involving both listening and speaking.	Beginning Reading - begins with small group of pupils. Increases to 3 or more groups of 5-10 pupils each by the end of the year.
Dramatization of stories to develop interest and projective techniques. Choral speaking to help develop good speech habits.	Continued Instruction with diversified methodology: individual groups of 5-10, occasionally the entire class.
Use of programmed materials with individual pupil-teacher conferences.	Televised Instruction - used to facilitate storytelling program of the primary grades.

LEARNING ACTIVITIES	TEACHING METHODS
Language Arts	
Reading (continued)	
	Television supplements reading program by bringing dramatization of classical literature into intermediate and upper grade classrooms.
	In grades 4-6 students are usually grouped by achievement into three or more levels rather than on an chronological age basis.
	Teacher works individually with pupils, using programmed reading material, or pupils working independently with very little teacher guidance.
	Teacher works with groups 3-5 to 10-15 with tachistocope drill and with the controlled reader, in word recognition. Flash cards or other devices may be used too.
	Using textbooks, the teacher typically works with 2 to 4 groups of 5-15 with groups alternating between teacher attention and seat work.
Handwriting	
Class instruction employing visual detail, usually on chalkboard.	Total class in attention, in small groups, with chart work in connection with reading program; or, individually with seat work while other pupils are otherwise engaged.

LEARNING ACTIVITIES	TEACHING METHODS
Language Arts	
Spelling	
Discussion of words on spelling lesson. Individual work in workbook, or use in sentences, etc. Class drill (phonics, analysis, or work attack, etc.).	Well to integrate as part of the reading program in grade one; later as separate subject. Involves teacher working with entire class sometimes, and with individual or small groups at other times. Tape recorders might be used here (as well as other areas). If the teacher records the week's words, the pupils could practice writing them at their convenience in an appropriate part of the classroom.
Listening and Speaking	
Show and tell. "It happened to me" type of speaking exercise. Oral reports.	To provide children with experience in speaking and listening. Children address the class about incidents in which they were involved, or about activities an individual or group has completed.
Dramatic Play	
Acting out reading lessons, material from other subjects, or interesting events.	Situations in which the children portray people in real life situations, and get a feeling for their problems. Pupil groups of all sizes.
Written Expression	
Summaries of what has been read; original poems, stories or plays.	Concentration is on individual creativity. While assignments are typically presented to class-size groups, most other contact is between teacher and the individual pupil.

LEARNING ACTIVITIES	TEACHING METHODS
History, Geography, Civics	
Lecture, Reading, Discussion, Reporting	
Teacher lecturing. Discussion led by: a) teacher b) pupils Pupil reports.	In the primary grades, the typical group is to a maximum of 30. In the intermediate and upper grades, combination of classes through the team approach allows the technique of depth study, individual and small group exploration, and problem-solving seminars. Television may be used to bring distant areas of study into the classroom. Lecture, small group discussion projects, and individual study comprise the basic methodology in this area of program. The lecture is adaptable to large groups of 30-90; small discussion groups of 5-10 emerge naturally.
Physical Activity	
Building models, maps, craft work dioramas, murals, posters.	Work by individuals and small groups, with general supervision and help from the teacher.
Mathematics	
General Instruction on Concept **Lecture, class discussion** **Programmed Materials** **Individual Problem Solving** **Use of Manipulative Materials**	Beginning in the first grade with picture materials and progressing to abstract symbols, teachers may present general lectures to groups as large as 90 pupils, even at the first grade level. Work with programmed materials is handled on an individual basis,

LEARNING ACTIVITIES	TEACHING METHOD
Mathematics	
Measuring, calendar, money, time, temperature, location size, weight, etc.	and manipulative materials are generally used to provide and strengthen basic concepts.
Science	
Lecture, demonstrations	In the primary grades, science is often combined with social science. Subject matter begins with exploration of the immediate environment and progresses toward the abstract.
Textbook assignments	
Experimentation	
Programmed Materials Use	Televised demonstrations and lectures are helpful. In the intermediate and upper grades, use of the scientific method and experimentation are greatly expanded.
View Televised Instruction	
	The team approach demands spaces where individual may work alone, where groups of 5-10, or more may work together.
Art	
Expressive Activities	
Two dimensional such as drawing, painting, color, and design, illustration, figure drawing.	Activities here are individual with teacher circulating for individual instruction. No special space is indicated, but movable and flexible furniture and equipment is desirable.
Three dimensional, such as paper sculpture, weaving, mosaics, leather, paper mache.	

LEARNING ACTIVITIES	TEACHING METHOD
Art	
Art Appreciation	Televised instruction can be used to supplement the abilities of the classroom teacher.
Music	
Group singing Music Appreciation Instrumental Instruction	Teachers lead group singing, and no special facilities or spaces are required. Rather, equipment and space requirements must be recognized. Televised instruction is utilized to supplement the teachers' abilities in this field.
Physical Education and Health	
Coordinated Exercises Rhythmical Activities Indoor Activities (games) Outdoor Activities	With harsh weather, outdoor activities are extremely limited. Space is needed for developmental activities. Clear inside spaces must be made available for rhythmic activities and games. Appropriate outdoor activities are recommended whenever possible.
Special Education	
An almost complete range of academic areas is offered to pupils at the competence level of the individual student. In addition, craft activity plays	Individual instruction is the methodology used in special education classes. Space requirements are the same as for the normal classroom, but

LEARNING ACTIVITIES	TEACHING METHOD
Special Education	
an important part in the program. Health and safety instruction help the child adjust to his environment. Social behavior and communication skills receive much emphasis.	special furniture and equipment must be provided.

Summary

School design should not only accommodate all of the recent trends in teaching methodology, but should be amenable to future developments. Because maximum utilization of facilities offers the greatest educational return to students, it is highly desirable that in-service programs be used to keep the professional staffs apprised of new developments. Changes or developments of the program may be inserted without major revision of these specifications.

The many space requirements, and how instructional programs relate to space is further developed in the following pages.

III. Determination Of Design Objectives

That the building must not stand in the way of program changes and educational progress, either in terms of the utilization of the staff or respecting the teaching program, is imperative. Rather, it should be designed for adaptability to educational innovations as they arise.

Toward such an end a number of fundamental planning assumptions are necessary. These assumptions define the nature of the functions which the school should serve, and list facts upon which planning for the new school should be based.

The first classroom should be planned for additions which, together, will provide adaptable and flexible space which fits together as an educational entity.

When several classrooms comprise the building, team teaching seems to maximize staff effectiveness and application of flexible educational techniques. This is therefore proposed as a basic instructional assumption for flexibility. It should be noted, however, that team teaching should not be initiated until teachers are ready to use it. Because team teaching is a whole-faculty effort it should be instituted in a manner and at a time comfortable to the staff.

Flexible facilities, including both building arrangement and instructional equipment, are also needed for maximum efficiency with team teaching. Where possible, facilities should be designed so that room size can be enlarged or decreased in order that teachers may vary their practices in whatever manner is required for effective learning.

The plant must provide for an adequate number of proper electrical devices for implementation of the educational program.

The application of television and other electronic and mechanical media for supplementing, enriching, and supporting functions of a quality

learning experience must be implemented in the building program. It is evident that meeting these needs has architectural implications. Provision should be made for electrical outlets, microphone and T. V. jacks located adjacent to the teaching wall for the use of T. V. monitors and clip-on pocket microphones. Additional electrical outlets should be located on all walls for general use.

Space for small group instruction should be incorporated within each classroom area.

A variety of group instruction patterns are utilized to fit specific kinds of learning procedures in the elementary instructional program. Group instruction may flow from team teaching activities, small group or individual sessions, and for any other patterns appropriate to special needs. The need to house a variety of group instructional patterns implies that there should be a variety of spaces, which can be at least partially isolated, in the elementary school. These should vary from large to small group, to individual learning spaces.

Space is needed so that pupils and teachers can use the materials at their disposal effectively.

An elementary program that endeavors to provide a rich diversity of learning opportunities for the wide range of individual needs, interests, and abilities found in the modern school must make use of every resource, both material and human, to the fullest extent.

The architectural implication for the one room or small school implies that library, audio-visual, and other special space needs must be combined into one classroom. The individual classroom should be designed so that specialization of rooms can be accomplished later, if and when necessary.

Design should incorporate the concept of expanded spaces for multi-use purposes.

An instructional area which can accommodate both large and small groups is useful in an elementary school. It provides an area for activities which cannot be carried on as well in either the typical self-contained classroom, or outside the building during inclement weather. The major usual activities requiring such space include assemblies and the indoor physical education program. But it should be noted that such space must be amenable to a variety of large group learning activities.

Space economy would indicate that wherever possible multiple use of space should be made. Efficient multi-use, however, will depend on the design of the facility. Adaptability for multiple use must not be forced at the expense of the educational program. Rather, it must arise from the efficient housing of many activities of the school.

Operating economy requires compactness which allows movement ease of pupils and learning functions.

Economy of construction and operation are important considerations because the smallest possible proportion of resources available to the district should be spent for non-classroom space, and for plant operation. To facilitate economy in Alaska, it is especially urgent that building perimeter and ceiling height be minimal. This will help avoid undue heat loss.

Spaces outside the building necessary to the educational function should be conveniently located.

The school should be so located on the school site that exterior spaces will be convenient. The exterior area for which provisions should be made are physical education, parking, and service entrance areas. Physical education and play areas should be located so that they are directly accessible. Whenever possible, areas should be separate for pupils of primary and advanced grade levels. Conveniently located parking areas

should be provided both for the public, and for the staff, and for visitors. If appropriate, parking areas may be combined. Service entrances should be located to provide maximum convenience for receipt of fuel, instructional materials, foodstuffs, and other goods, and for disposal of waste materials. In addition, space should be provided to facilitate the handling and storage of materials.

Design should consider the applicability of windowless classrooms to promote construction and operational economy.

No evidence of negative effects of windowless buildings has been found in Utah, New Mexico, Michigan, Colorado. Missouri, Kansas, or Maryland school buildings. It is recommended, therefore, that serious consideration be given to planning classrooms without windows, or with limited fenestration. The trend is clear; school architects meeting in Atlantic City during February, 1964 found that "schools are being designed with fewer or no windows." Construction and maintenance costs are lower, and heat loss is less. In addition, the thermal environment can be more effectively controlled. Moreover, room flexibility is enhanced by having added wall space available for instructional purposes.

IV. Design Implication Of Specifications

Designing Alaskan elementary classrooms requires meeting limitations not common to schools of typical American communities. These must be kept in mind by architects.

The necessity for minimal perimeter and ceiling height and the desirability of minimizing heat loss have been pointed out. A more variable requirement is the need to cope with whatever soil characteristics prevail in designing the foundations. Special attention must be given to permafrost, which when present, requires special foundation treatment.

The desirability of combining teacherages with the classrooms (and the disadvantages of not doing so) pose further design problems, but the advantages of unitizing the teacherage with classrooms is of critical importance. This will be treated in greater detail in the following pages.

Fundamental Space Concepts. In deteriming space allocation to the classroom, two considerations are fundamental: 1) definition of minimum space per pupil, and 2) definition of the maximum number of pupils to be served in one classroom. A related consideration is use of the classroom for general community purposes.

Storage of instructional materials for an entire school year should be contemplated. Associated space is also needed for storage of foodstuffs for lunches, possibly for water and certainly for fuel storage for differing (but extended) time-use periods. Under many circumstances, stored items will need protection from low temperatures.

Storage space needs should be considered as additional to minimum space recommended for classroom use.

Classrooms should contemplate an absolute maximum of thirty-two pupils, with no less than thirty-five square feet per pupil. No classroom should be constructed with an area of less than 1,120 square feet, unless provision is made for convenient expansion. Design should be such that the room can be temporarily partitioned, if the number of pupils is fewer than fifteen. Space initially not used for learning can be used for storage, or allowed to remain idle.

The first room should be so designed as a working unit with the first teacherage unit. Floor level should be the same elevation so as to allow an additional room to be attached later, if needed. Toward such an end, a hexagonal or octagonal shape for the classroom and teacherage complex, with space for a second classroom should be considered by the architect. In such an arrangement, initial use (one classroom, one teacherage), would commit two-thirds of the projected space, leaving one-third. This third might have a roof covering for future classroom development, or might include a walled, roofed, unheated play area. Approximately equal space should be allotted to the classroom, the teacherage, and the later-to-be-completed, second classroom.

Either one or two classrooms can be served by one teacherage, thus establishing the pattern of two-classrooms with attached teacherage as a working "cluster" unit. Similar additional units can be constructed to provide additional classrooms and teacherages. Note, however, when four or more classrooms are constructed initially, three of the classrooms should constitute a cluster.

Special Facilities. In addition to water, sewer, gas, and electrical lines as needed, and available, provision should be made for:

1. Extending telephone service to added areas of the school.
2. Provision should be made for use of two-way radio communication between individual schools, and between schools and area or

central instructional centers.

3. Clocks in every classroom and other spaces. Provision for a master clock system is not necessary in from one to three classroom complexes. With a larger number of classrooms, a simple master system is recommended.
4. A "co-ax" distribution conduit for television reception should be directed to each classroom and terminated in suitable wall receptacles. It is desirable to locate the wall receptacle at the left front corner of the room, design permitting.

Utilities

What utilities are appropriate will depend, to a considerable extent, upon the location of the school. Where power or other utility services are available, they should be used. In cases where the school must provide its own utility services, design should allow transfer to commercially supplied utilities with minimum difficulty.

Electricity. When electricity is not available, it will be necessary to generate it for the classroom-teacherage complex. The generator should use the same fuel as for heating, to simplify storage and maintenance. The capacity of the generator should be 200 per cent of the maximum need for the specific unit (teacherage or classroom). Separate generators should be provided for each unit, to a maximum of two units for the entire complex. Preferably generators should be identical models; minimally, parts should be interchangeable.

Line loads of the complex should be computed carefully to maximum requirements and a provision made for 100 per cent additional capacity, in both trunk and feeder lines.

Ventilation. It is recommended that ventilating equipment be installed. To the greatest possible extent provision should be made for filteration of air, so as to minimize the amount of outside (low temperature) air needed in the classroom and living space. No reliance should be placed upon ventilation by or through windows. Ventilation should be forced, and appropriately controlled so as to guard against excessive air movement in classroom or living areas.

Water. Storage space which guards against low temperatures should be provided for water. Long-life hot water tanks should be installed to minimize replacement problems; two forty gallon tank are sufficient for the complex. Fuel for the heaters should be the same used for building heat and power production.

Disposal. How this problem is met will depend upon geographic and soil conditions. Care must be taken by the architect to provide adequate, sanitary disposal of waste products.

Heating. The heating system should be combined with the ventilating system to provide fresh or re-freshed air of the proper temperature. Systems should be designed for each unit (up to two) of the complex, each designed to maximum requirements, with a 100 per cent additional capacity. This will provide stand-by capacity in the event one system should become defective. All systems in a school complex should be of the same design so that parts are interchangeable. Under most circumstances, fuel oil will be used for both heat and power. Storage, designed to protect against excessively low temperatures, must be provided; in addition, there must be sufficient storage capacity to assure a supply for whatever time-period is required. A plus capacity of thirty per cent is urged to cover contingency conditions. Design should provide for fire protection.

Pupil Wardrobe Space

Space must be provided for storage of outer clothing of pupils. This should be in an area separated from the classroom, but not necessarily a separate room. If clothing storage should be provided for in a separate room, its temperature can be well below that of the classroom proper, thereby saving heat. Movable wardrobes, suitable for use as room dividers, are recommended.

Chalkboard, Tackboard and Pegboard

From sixteen to twenty lineal feet of adjustable chalkboard is sufficient for an elementary classroom. Lighter colored boards are recommended; they are preferred to black chalkboards as they provide greater reflection. Map rails should be installed at the top of all chalkboards.

A similar amount of tack or pin board space is needed. A "pin-wall" is probably the best approach in that it provides a tack surface from floor to ceiling. All such board should be color coordinated with the remainder of the room.

Pegboard can also be used to advantage for display purpose. Eight lineal feet of pegboard in each room should be adequate.

Sinks, Toilets and Drinking Fountains

The sink should be located on the workcounter, which should be secured to a section of one of the walls. The counter should be twenty-eight inches* in height, and the sink should have a minimum width of eighteen inches and length of twenty-four inches. Both cold and warm water should be provided. The counter should be at least twenty-two inches wide and sixteen feet long, with drawers and closed-shelving below it. It is urged that a standard

*Height given is for use when only one classroom is constructed. Lower the height by four inches for primary, two inches for intermediate classrooms.

manufactured item be selected for this purpose.

One fountain should be located in the room, either as a component of the sink-counter complex, or separately. It should have a sanitary nozzel, and should be twenty-eight inches* in height from the floor.

It is recommended that only one toilet room be provided for the single classroom; it is further recommended that consideration be given to joint-use of toilet facilities between school and teacherage, for use during community-use functions.

Room Furnishing. It is recommended that equipment and furnishing items (with the exception of wardrobes) mentioned in previous paragraphs of this section should be permanently located. All other furniture or equipment items should be movable. Note that this does not include food-service equipment; this should be a component of the teacherage.

General Furnishings

Pupil and teacher stations should be movable, as should cabinetry. Because rooms will need to be used for many purposes, furniture should have maximum flexibility. It should be light enough for moving ease and it should be amenable to stacking (storing) in minimal space. Chair-desks units should not be used.

Teacher Station

It is important that sufficient work space be provided for the teacher, with more than one working surface, together with integral file and storage space.

Homemaking Equipment

Space allocation should contemplate upper-intermediate and upper

*Height given is for use when only one classroom is constructed. Lower height by four inches for primary, two inches for intermediate classrooms.

grade pupils helping the teacher in food preparation for lunches. It is not contemplated that this will be laboratory-type equipment, but rather that sufficient development be planned for the general (teacherage) kitchen to facilitate this purpose.

In most cases, general purpose pupil-work tables will be adequate for non-food type of homemaking learning programs. These should be of the identical height.

Shop and Craft Equipment

Partly because of the nature of adult-world, and partly because of the necessity of extending competencies of both girls and boys to cope with adult problems, a comprehensive shop and craft program is needed. It should be noted that this may be extended to adult use, or recreational-vocational use by adult members of the community during times the school is not in session.

Instructional work surfaces need to have surfaces which are satisfactory for craft and light shop purposes. Special equipment (a craft bench) should be available in each classroom when schools are single room, or one to a complex, where several rooms comprise the school.

Space will be needed for storage of this equipment (in movable cabinets), and for tools required for carrying on the various activities.

Outlets

A generous supply of electrical outlets should be provided in each room. Considerations should be given to zoning of utilities in spaces which are divisible.

Color, Decoration, and Acoustical Treatment

Colors should be coordinated throughout. Ceilings should be highly reflective (white or off-white); wall colors should be in soft tones; the

floor should provide moderate light reflection. If windows are used, consideration should be given to painting the window and rear (non-chalkboard) wall lighter. Throughout the unit (school or teacherage) hues to improve light reflection and to provide variety with compatibility should be used.

Outdoor Play Areas

Because of much inclement weather during the school year, outdoor spaces must be designed and related so as to utilize play spaces in the most economical manner. Locations should consider prevailing wind patterns, and be as protected as possible. Emphasis should be for developmental, rather than competitive, physical activity. Separate developmental areas should be provided for the primary and intermediate levels when possible.

It is recommended that the primary apparatus area should contain the following equipment:

climbing towers (jungle gyms);
horizontal bars in sets of three (36, 48,and 52 inches from the ground);
horizontal ladder, 16' long, 66" from the ground;
monkey rings (traveling rings).

The intermediate grades apparatus area should contain:

horizontal ladder;
horizontal bars, in sets of two with heights of 68, and 74 inches;
climbing ropes;
monkey rings.

Science Equipment Requirements

The science program must be developed within the classroom unit. The capabilities of the teacher should be supplemented as much as possible by use of films and mechanical or programmed instruction. Demonstration and experimentation can be improved by use of a portable

science laboratory.

Each cluster should have a science laboratory cart approximately 6' wide x 2 1/2' deep and 3' high and this must be able to pass through doorways. Each unit should contain:

gas burner unit;
electrical outlets with retractable plug-in cord;
formica hot-top (heat resistant);
storage areas compartmentalized to keep equipment separated;
styrofoam padding for glassware;
other materials and simple compounds appropriate to needs.

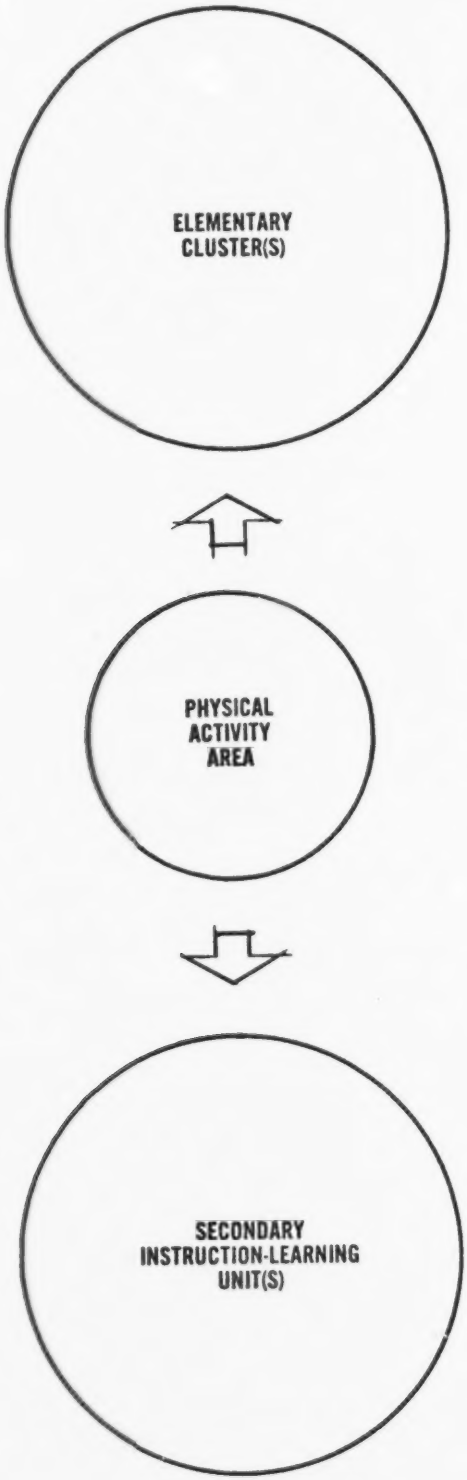
Audio-Visual Equipment Requirements

To satisfy possible video needs of the program, it is recommended that conduit be installed to provide each classroom open-circuit broadcast television. In addition, there should be one permanently mounted projection screen, with width of eight feet to accommodate the larger image required for group use. The screen should be ceiling-mounted approximately two feet from the wall surface with a fastener at the wall base to enable a downward cant.

The possible eventual installation of all video projection equipment, should include planning to allow: low silhouette overhead projection, 2" x 2" slide projection, 35mm filmstrip projection, 16mm movie film projection, and opaque projection.

Orientation with High School

As indicated in Section I (Planning for Alaskan Schools) economy of facilities requires contiguous placement of the elementary and high school facilities. The generalized concept for this is shown by the following illustration.


ELEMENTARY
CLUSTER(S)
PHYSICAL
ACTIVITY
AREA
SECONDARY
INSTRUCTION-LEARNING
UNIT(S)

III. LIVING QUARTERS FOR ALASKAN TEACHERS

Modern concepts of instruction require highly skilled teachers who have broad backgrounds, including curricular and psychological insights, and competence in the use of modern devices for instruction. The demand for such instructors far exceeds the supply.

While salary is a vital criterion in attracting quality teachers, other factors are important, too. These include adequate living accommodations, an adequate educational facility, and other physical and material considerations. Both tangible and intangible factors work together to attract and retain quality teachers. Because good teachers lead to good schools, all reasonable effort should be invested in securing and keeping competent teachers.

It is equally obvious that high school-teacher turnover leads to a poor and inefficient operation. In addition to the cost of recruitment, replacement, and training in local procedures, there is an additional cost, almost impossible to measure in dollars, of lower teacher effectiveness in new and strange situations.

The survey staff assessed the effect of teachers' living facilities upon learning. Evidence strongly indicates that unsatisfactory or inadequate living quarters seriously affect the techer's performance in ways deleterious to pupil progress. The apparent need to improve teacherages leads to the specific recommendations which follow.

General Considerations

The satisfaction and dissatisfaction of Alaskan teachers was assessed in the publication, A Foundation For Alaska's Public Schools. Poor

housing, inadequate salary, lack of recreational and cultural opportunities, inadequacy of school buildings, geographical isolation, and harsh climate were the major sources of dissatisfaction.

These findings have been confirmed by the survey staff, which found the complaints particularly grievous in the rural schools. Additional evidence of dissatisfaction may be inferred from the high average turnover rate among teachers in rural Alaskan schools. It is three and one-half times that for the nation as a whole, the turnover rate being fifty-seven per cent. Consequently, of ten teachers employed in any given year only four will be present the next year. Because turnover affects instruction, the survey staff interviewed rural teachers to determine what would constitute adequate living arrangements for teachers. The following plan was pursued:

> Staff members visited rural Alaskan schools in different parts of the State to talk with teachers and administrators, to evaluate the facilities, and to secure information so as to get a "feel" for the problem.
>
> Present buildings were evaluated after ascertaining from teachers what would constitute adequate living quarters. This was handled by a stratified mail sampling survey.
>
> Data received from teacher survey was analyzed with help from the School Planning Laboratory staff. From this, educational specifications for teacherages were developed.

Teachers often supplied more information than requested, indicating the vital importance of the subject. An interesting side light came from the comments: teachers in rural schools demonstrated high loyalty to their school, per se, coupled with intense pride in Alaska, its educational system, their positions and responsibilities. These positive feelings existed side-by-side with obviously low over-all morale. From this the

staff judged that adequate facilities would significantly improve teacher morale, and in time would result in financial savings and educational gains.

The Sampling Survey. The School Planning Laboratory questionnaire sought to measure the condition and type of housing currently occupied by rural Alaskan teachers: i. e., whether the unit was single or multistoried, its ventilation, insulation, storage facilities, flooring material, lighting, arrangement of rooms, doors and windows, household appliances, and general space accommodations, among other physical inquiries. Information was also secured concerning the marital status of occupants, and whether there were children in the family. A separate part of the questionnaire assessed teacher feeling concerning what constituted adequate living quarters. Teachers could react to such diverse questions as the need for two bedrooms, or whether curtain rods in the bathroom were necessary, desirable, or not needed. Generous space was provided for comments. The format of the questionnaire is included in the Appendix of this report.

Analysis of Present Housing Facilities. One hundred usable questionnaires were returned. These were adequately distributed geographically.

Forty-six per cent of the housing units presently occupied were one-story single-family units. Ten per cent were one-story multi-family units, and the remainder were in other categories. Approximately fifty-nine per cent of the respondents were married. Among those with children, half had youngsters under six years of age.

Two-thirds of the living units were amply ventilated, but only half were sufficiently insulated to prevent undue heat loss. One-third were constructed with flooring material and wall surfaces difficult to keep

clean. Another third were inadequately lighted.

Nearly half of the respondents commented regarding inconvenient trash and garbage removal. Over eighty per cent felt that a back door was a necessity, although only sixty per cent indicated that there was one in their present facilities. Only a third of the units were reported with adequate electric wall outlets.

A major problem was lack of storage facilities, with fifty-six per cent reporting inadequate space or poor arrangement. This may be broken down as follows: forty per cent noted trunk and luggage storage inadequate, thirty-five per cent indicated tool storage unavailable, thirty per cent protested the lack of space for cooking utensils and dishes, and forty-nine per cent felt clothing storage inadequate. Over a third reported inadequate space for books, cleaning equipment, and bathroom supplies.

In field interviews and from questionnaires it was noted time and again that teachers felt they "were not asking for the moon," but for a warm, decent place to live, with adequate space as a vital necessity. Problems unfamiliar to many Stateside residents obtain: food must often be stored for six months; water may be frozen for months at a time; low quality oil may freeze in carburetors and cause critical heating problems; repair of equipment often requires weeks or months for replacement parts. All of these difficulties result from transportation problems and severe climatic conditions.

Teachers maintain that their position is half teaching, half "millwright." Lack of maintenance personnel forces them to perform operations with which many are totally unfamiliar. Although some are able to adjust and repair equipment, a definite loss of morale results.

Actual conditions may be most effectively illustrated by citing a few case examples:

Case 1, Southeastern Alaska

This teacherage is a ramshackle, weatherbeaten structure divided into three apartments. When one climbs the partially decayed wooden entry steps, the feeling of hopelessness becomes acute. A family of four is jammed into one of the inadequate units. Books and sundry items are piled high around the rooms. The kitchen was hopelessly inadequate and badly arranged. The cramped bathroom was shared by members of the entire teacherage, as the second bathroom was inoperative. Sewage was discharged directly to the beach behind the house; raw sewage was exposed during low tide.

Teachers often did not even fulfill one year contracts; the turnover rate at this school was 130 per cent annually.

Case 2, Southcentral Alaska

This teacherage was part of an old house pressed into service as a school building. The two room school was taught by the couple, in their first appointment year. A door led from the schoolroom into the living room. Indoor toilet facilities were lacking and substitute devices often had to be used because of inclement weather. Because of freezing, water often had to be carried from surface streams for cooking and drinking. The entire quarters were cramped and highly inadequate. There were no roads; air transportation was the only means of access to the school during much of the year.

Case 3, Kenai Peninsula

Attractive and spacious residential quarters above the school building presented a picture of order and neatness. There was about 1400 square

feet of space, which provided adequate storage for all necessary items. Occupants were entirely satisfied.

Problems Defined. Some of the urgent problems relating to living quarters for rural teachers are identified by the following concerns:

Differences in size among the teacherages. Floor space varies from 500 to over 1200 square feet. Space arrangement varies from poor to good. In many units space is so poorly arranged that its usefulness is greatly impaired.

Differences in furnishings among teacherages. It is common to find wide differences in quality and usefulness of teacherage furnishings. Many contain the modern styles while other are reminiscent of World War I or earlier decor. The condition of the furnishings have comparable variability, from excellent to shabby. Some have such conveniences as deep freezes; others possess only the basic plumbing facilities (and these may be inoperative at times!).

Differences among teacherage and community rent. In most rural school areas there are more teachers than can be housed in a teacherage. The head teacher usually lives in the teacherage, paying from $35 if single to $75 if married. Teachers who are forced to secure community housing often pay as much as $150-225 for sub-standard housing. In addition, they may have to pay for utilities, and this may cost as much as $100 a month, or more. As a result, there exists a great variance in the cost of housing to teachers. More often than not, teachers who are newly employed and earning lower salaries are the ones who must rent in the village, thereby compounding

the inequity.

Inadequate sleeping quarters. Official and non-official guests constantly arrive to study or investigate the isolated school. The visiting health nurses, educational supervisors, friends, and others must have a place to stay during their visit, if hotel or other commercial space is not available. As a result, the teacherage, regardless of its size and condition, is pressed into service. How acute this need is can be illustrated by noting that one teacherage had visitors 250 nights during the year.

Inadequate water and sewer facilities. Three-fourths of all Alaska teacherages have inadequate water and sewage facilities. Facilities are often totally inoperative during certain periods of the year, or in such poor condition as to be of limited usefulness. Surface streams are often the only source of water. Sewage disposal is a grievous problem in many regions during the winter season.

Inadequate storage. Climatic conditions require a large amount of bulky clothing and footwear. Limited transportation imposes the added need for storing large amounts of food and other necessities for many months at a time. Ample space for storing needed materials is essential.

Poor condition of teacherage. In some areas, climatic conditions limit the time available for proper exterior maintenance of teacherages. In addition, transportation difficulties impose further maintenance difficulties. These problems can be mitigated in two ways: 1) definite responsibility must be assigned to occupants of the teacherage for upkeep and

maintenance. This, obviously is an administrative rather than an architectural consideration, but it is nevertheless urgently important; 2) careful choice of materials which may be quickly and easily maintained is a fundamental requirement.

Specifications for Living Quarters

Proper design considerations so that the building harmonizes with its setting are highly desirable. A variety of approches can be applied to satisfying considerations applicable to Alaska teacherages.

Physical Considerations of Locations. There is pronounced variability in climate and terrain which must be provided for in teacherage planning. Suggestions for meeting special needs follow.

Site. Adequate drainage, bearing conditions of the soil, permafrost occurrence, and other engineering considerations are important site selection criteria. Esthetic factors also merit consideration. Placement of the teacherage in relation to the school should be directed toward enhancement of the entire property. It should be positioned so that the occupants are able to enjoy any scenic views. The living room, in particular, should be placed to give the maximum benefit from such attractions.

Sun, wind, rain, and shade. Orientation of the teacherage must take into account the northern latitudinal position of much of Alaska. South of Arctic Circle, major rooms demand placement to receive the winter sun. In much of southeastern, south-central and central Alaska, trees may be used effectively for shade, as well as reducing the effects of wind.

Climate. Climate has special implications for Alaskan teacherages; they must meet climatic exigencies which require a large amount of time being spent indoors. Indoor living areas must be large enough to develop freedom of movement.

Land use. Proper planning and scheduling of land use should be visualized up to its final development. Designing the residence to harmonize with the natural terrain of the property will result both in a more attractive place to live, and a more satisfying one.

Basic Essentials of Planning Teacherages. Four elements demand detailed attention in planning teacherages. These are circulation, livability, storage, and space relationships. While each is important, it is possible that specific needs in remote areas may require more emphasis on one element than another. Certain teacherages, for example, are isolated for months, a condition which may require storage needs overweighing other considerations.

Circulation. Circulation refers to movement from one part of the structure to another, and in and out of the residence. Definite paths of circulation occur in rooms having more than one entrance. Poorly planned, the room may be transformed into a thoroughfare which interfers with furniture placement and creates unnecessary disturbance to occupants. Careful planning can produce good circulation features.

Hall space should be kept at a minimum, although furniture movement dictates a thirty-six inch minimum width. It is desirable to provide inner and outer entry door arrangements to provide an area for the removal of parkas, raingear, and

overcoats before actual entrance into the living area. Flooring for this outer area should be water resistant.

Kitchen-Dining Area. The serving area of the kitchen should adjoin the dining area. It should be convenient to the principal entrance and accessible to the utility room. Special attention should be given to making it convenient for the lunch function of the schoolroom. This should be large enough so as to permit freedom of movement for more people than customarily occupy the residence.

Toilet. This facility should be accessible from the hallway and convenient to all bedrooms. It should be easily available to the living area, but the door should not be in a direct sight line.

Livability. This relates to the adequacy of the residence for recreation, sleeping, eating, food preparation, washing, storage, and family activities. Because many of the teacherages are located in remote areas, it is essential that careful consideration be given to design which will act to compensate for the rigorous demands of isolated living.

Many existing teacherages are very small and have little or no mechanical apparatus. Such deficiencies must not be repeated in new residences. Rather, space allocations must contemplate the possibility of new appliances in future years. In addition, planning should seek to utilize the concept which create the illusion of more space than really exists.

Living Area. The living area should provide space not only for conversation, but also for family and individual activities. It should adjoin the dining area so both may be used together when needed. There should be sufficient space for entertaining a number of visitors.

Other Rooms. Individual rooms in the teacherage should have flexibility. The third bedroom should be designed to serve equally well as a

study area or den. Similarly, the dining area might be used as a play area. Flexibility thus extends the livability concept.

Ventilation. Forced ventilation is recommended for thermal control and maintenance of an adequate supply of fresh air. Planning should consider the value of air filtering equipment to reduce to the minimum the introduction of cold, outside air.

Storage. Providing ample storage is imperative in the design of the teacherage. While Alaskan teachers seem to feel that there cannot be too much storage space, reason should prevail in space allocation.

A closet near the entrance is essential for the storage of parkas, overshoes, and other outside gear. In the living area there must be adequate storage space for books, records, magazines, and toys. Bedroom closets should be large. Wardrobe type closets are recommended because of their convenience. Linen storage areas should be located near bedrooms; medical supply storage cabinets (with locks) in the bathroom.

Space for luggage, food supplies, and other miscellaneous items must be conveniently located and ample for storage of materials for an extensive time. For this purpose, the basement space could be developed and be used in some areas, although basements are not, in general, recommended.

Space Relationships. This refers to location of the teacherage in relation to sun position, prevailing wind direction, other structures, overall view, and the transportation routes. Careful attention is required for optimally satisfactory placement.

Planning the Interior of the Teacherage

It is possible to design a residence to satisfy most people who will occupy it. The following suggestions are directed not only at this goal but also to meet problems unique to Alaska.

Furnishings. Since it is extremely costly for teachers to transport furniture in rural Alaska, it is recommended that the current practice of furnishing teacherages be continued, but with good quality pieces. All components should be selected to enhance the livability of the teacherage. What furnishings should be purchased are outlined in the Bureau of Indian Affairs Manual on this subject. The publication is recommended as a guide. The component items should harmonize in terms of size, motif, and quality.

Color. Color has a special value because it can accomplish much at little cost. Accentuation of desired features in a living area, creation of "atmosphere", and the seeming enlargement of a small room all may be effected by proper and pleasing color arrangement. This applies to wall, ceiling, and floor covering, as well as furnishings. Soft wall colors provide a suitable background for furnishings which have a more vivid color scheme. It would seem especially appropriate in remote areas to use color to reasonably brighten the teacherage.

Planning for Warmth and Light

The major heating problem is caused by poor oil which "freezes" due to its water content. To cope with this, provision must be made to protect the supply (or part of it) from extremely low temperatures. In many rural villages no one may be available to repair equipment. Because of this circumstance, it is vital that quality equipment be correctly installed. Initial cost must be viewed as secondary to maintenance problems.

Proper heating is as much dependent on house construction as upon heating apparatus. Storm doors, double "thermopane" windows, well caulked joints around frames, and insulated ceilings and walls all contribute to increased comfort and lower heating costs.

Utility. Heating and ventilating equipment, and power generators should individually be of the same make as in the school unit, and if possible for all facility units in the area. By such an approach standby equipment, which is necessary, can be kept reasonably available at minimum cost and effort. All utility units need a plus 100 per cent capacity for safety and standby use. Bidding processes should be directed toward obtaining units and parts which allow interchangeability.

Planning Kitchens

Properly designed kitchens promote efficiency, which is extremely important in Alaska, because both man and wife often are employed as teachers, and because pupil lunches also must be prepared.

Storage. In rural Alaska it is necessary to store up to a six months supply of canned, packaged, and bottled foodstuffs of all types. In addition, space for the usual cooking and eating utensils (approximately 300 separate items) must be provided.

Storage must accommodate supplies without crowding and with a minimum of stacking. Both wall and base storage must be used effectively. Wall cabinet storages with twelve inch shelves are appropriate for dishes and small food packages. Large food packages may be stored in base cabinet drawers or wall cabinets. In many cases drawer storage provides better accessibility than shelf storage. For added convenience, stock items should be stored convenient to the kitchen.

Work Centers. Each work center should be conveniently related to the others and should be placed so as to minimize kitchen traffic. Counter surfaces should be continuous wherever possible. Cabinets should be selected to accommodate the equipment and foods needed at each work center. The various work centers include the cooking and serving area,

the food storage and preparation area, and the cl an-up center. Placement should allow a left to right movement through the preparation process, with ample space for each activity.

Planning the Toilet

A crucial need in Alaska living quarters for teachers is for improved toilet facilities. Items which should be given consideration in the planning of the bathroom include the following:

Large medicine cabinets

Many areas served by small schools are in remote areas, some of which are seriously isolated. In addition, and because of the usual absence of physicians and nurses, teachers often are expected to help with first aid and other health needs. Accordingly, a generous supply space (4" deep x 20" high x 36" wide) is required for storage of medical supplies. It should have a lock.

Adequate storage

It is suggested that a six cubic foot storage be placed above the water closet, that an additional ten cubic feet of space be located under the lavatory. Cabinet depth, in general, should not exceed sixteen inches, except where the surface item (i.e., lavatory) requires more. Storage space for soiled linens should also be provided.

Other considerations

Walls and ceilings should be accoustically conditioned to insure quietness. Vertical grab bars for tub-shower should be non-skid. The door lock should be operable from both sides. Light sources should be located so as to assure ample light for all areas; other

outlets should be convenient to applied uses. All light switches should be out of reach of bathing areas, preferably outside of the bathroom. Electric heaters, if used, should be recessed and adequately guarded. A special exhaust fan for odor elimination should be installed, operating in conjunction with the major light fixture.

Planning Bedrooms

It has been noted that the living quarters must be constructed to serve a wide range of families. It is recommended that spaces suitable for three bedrooms be provided. One of the bedrooms should be adaptable as a study or family room. This space should also be suitable for housing officials or other guests, who when visiting the school or teachers must be provided sleeping quarters. Adequate storage should be adjacent.

Planning Storage Facilities

There is need for considerable amount of storage space suitably located for convenient and efficient use. It should be noted that built-in-units, advantageously located, help conserve space. The major locations and types of articles to be stored are: 1) Living Area (or study): outside clothing, books and magazines, school papers, desk supplies, radio, record player, records, table linens and dinner ware, 2) Bedroom Area: clothing (each bedroom), bedding, bathroom supplies, and toilet articles, 3) Utility Area: equipment and supplies for cleaning, work clothes and winter over-garments; and, 4) Unassigned: indoor and outdoor toys (should have space in several rooms), folding or day-bed (study or third bedroom a good location), luggage, sports and recreation gear.

Design and construction. In order that each storage unit might be properly utilized, design and construction details must be given careful

consideration. It is recommended that storage unit shelves be adjustable. Storage units should have full-access fronts. A number of different kinds of doors are available for full-front closet and storage openings; the most appropriate should be selected. Hinged doors are required when storage racks for accessories are to be mounted on the inside of the door.

When drawers can be utilized more effectively than shelves, they should be provided. Drawers should be of varying depths, from three to ten inches, most of which will be approximately eight inches deep.

To assure maximum accessibility and economy of space use, general purpose cabinet depths of twelve to twenty-four inches are appropriate. Such units either can be constructed or prefabricated. In either case, consideration also should be given to their usefulness as partitions between rooms. When units are placed side by side they can open into the same room or into adjacent rooms. In such cases, units should be equal depth. Units may also be placed back to back to serve adjacent rooms.

Related storage space may be placed above other units. A gun-fishing tackle unit, for example, might be placed over a hunting clothes-boots unit. Since Alaska is an area where outdoor sports are popular, a cabinet to store hunting, fishing and other gear is desirable.

Space for storage of toys for indoor play should be in shelving twelve inches deep with doors. A height not in excess of forty-eight inches will permit reach by small children.

Units with depth of sixteen inches will accommodate the following household articles: desk supplies, bathroom supplies, work and outdoor over-clothes, sports equipment, and cleaning equipment and supplies.

The desk unit should fulfill the function of writing surface and storage space. Drawers which should be at least sixteen inches deep and should

be installed below the writing surface.

Work and outdoor clothes such as parkas should be stored on hooks rather than hangers. The closet for these articles should be approximately sixteen inches deep, and convenient to the entrance. A low shelf, four inches from the floor, should be provided for mukluks and other damp boots and shoes. This space should be ventilated.

Cleaning equipment and supplies can be stored in a unit sixteen inches deep and thirty-six inches wide, to assure accessibility to articles within. Shelves may be inserted if desired, but should allow a minimum height of sixty-four inches for such articles as brooms, mops and ironing boards.

Storage units twenty-four inches in depth should be provided for most household articles. The most common of these articles are clothing, bedding, luggage, and the added storage needs for guests.

The bedroom storage unit should have an inside depth dimension of twenty-four inches. Eight lineal feet of rod space per bedroom is adequate for clothing. An adjustable rod with maximum height of sixty-four inches is recommended. A storage shelf twelve inches deep should be located approximately 66 1/2 inches above the floor.

Luggage should not be stored in the bedrooms, but provision for its storage is essential. The luggage unit should be forty-eight inches wide, twenty-four inches deep, and forty-eight inches high, with two adjustable shelves.

A storage unit to meet the needs of frequent guests should be located near living area, or in study room. This unit should be adequate for a folding bed and for clothing and other storage needs of overnight guests. A fourteen inch space should be provided for hanging full-length garments. Drawers or trays should be included to take care of bedding and folded

materials. This unit should be ceiling height, six feet wide, and two feet deep.

Size

Because of the relative large amount of time spent indoors in Alaska, it is appropriate to allow at least as much space as for a minimum-sized typical three-bedroom home. The overall floor area should approximate 1120 square feet, exclusive of specialized storage, or space required for utility equipment or fuel.

IV. RURAL HIGH SCHOOLS FOR ALASKA

There is an impressive need for small high schools in Alaska. As noted elsewhere in this report, the Alaska Commissioner of Education reported in 1962 that three-fourths of native youngsters never enter high school. This condition stems partly from the lack of available high school facilities and programs - available, that is -- in the sense of being readily accessible to students where they live.

The desire to take secondary education to the students is commendable. In Alaska, because of the sparsity of population in many regions, this means small high schools. In this report, we define "small" to include high schools ranging in size from a mere handful of students to as many as 150.

Schools of this size, to function effectively, cannot be mere miniatures of the large comprehensive American high school, either in facility or in organization of the teaching-learning process. They can, nevertheless, provide quality education which will permit their graduates to take their rightful place in adult society and to compete successfully with graduates of larger high schools.

The recommendations which follow accept the premise that Alaskans desire high quality education in their small rural high schools. If this is not accepted, provision of small high schools would represent both a waste of the state's resources and continue an injustice to some Alaskan youth.

Recommendations are also based on the assumption that Alaska will use the 8-4 plan of organization for its rural schools - i. e., an eight-year

elementary school (possibly plus kindergarten) and a four-year high school. This plan, however, may not be the most suitable for some regions. If the state wishes to make comprehensive vocational programs available to all students, for example, the 10-4 plan might be more appropriate. Under this plan, the rural "elementary school" would be extended to include the tenth year of general education. Students would attend these schools in their respective villages and complete their general education. The four-year regional schools would include the last two years of the conventional high school plus two years of post-high school education. Here students would receive specialized training, in preparation either for direct entry into skilled occupations or for admission to college.

The point is that, for economic as well as for educational reasons, comprehensive occupational training programs require large numbers of students. Small high schools cannot offer broad programs of vocational education, although they certainly can offer satisfactory pre-vocational programs. Indeed, except in large metropolitan areas, it is doubtful that the conventional high school can provide the answer to vocational education. Hence, this section of the report does not detail specifications for vocational education facilities. Rather it is based on a quality program of secondary education in small four-year high schools.

The Educational Program

If equality of educational opportunity is to be guaranteed, the educational program in the small high schools must be as broad in scope and as deep in quality as the program in the large high school. To function effectively and efficiently however, it must be organized in a

flexible manner and geared to the needs and abilities of individual students. This concept has been advocated in the Alaska Administrative Manual: "The needs, abilities and future (plans) of high school pupils vary widely. Because this is so, programs for students should be developed individually, rather than with rigid and inflexible high school schedules and territorial course of study."[1]

To implement this concept, two aspects of program flexibility are essential: 1) Flexible grouping suggests that not all instruction will take place in the traditional class of 25-30 students. In fact, an increasing portion of the instructional time will be spent in individual study and independent laboratory work or in small group discussion activities. 2) Flexible scheduling suggests that time will be allocated on the basis of the unique and legitimate time requirements of different kinds of learning activities. With the use of modular time units, different courses and different types of instruction will be assigned varying time patterns. Much of the student's time will be spent in individual study, and much of his contact with the teacher will occur in personal counseling situations -- what one educator has labeled "education by appointment."[2]

Such flexibility permits multiple-class teaching, an approach by which a given instructor teaches two or more subjects to two or more groups of students during the same time period and in the same space. This technique facilitates the offering of a broad program to all students in the small high school without impairing the quality of that program.

Within this context of flexibility, the small high school will offer

[1]Administrative Manual, Alaska State Department of Education, 1958.
[2]B. Frank Brown, The Nongraded High School, Prentice Hall, 1963.

comprehensive programs in each of nine subject fields: language arts (English and foreign language) social studies, mathematics, science, business education, industrial education, homemaking, the arts (including music), and health and physical education.

Language Arts. The problem of bilingualism, to the extent it exists, will largely have been overcome by the time the student reaches high school. Nevertheless, providing experiences which will enable the student to attach meaning to the vocabulary of the English language will continue to challenge the high school teacher. Beyond this, the high school program in English will concentrate on three basic purposes:

> The continued improvement of basic communication skills -- listening, speaking, penmanship, vocabulary building, mechanics of expression, spelling, and speed of reading comprehension. This purpose can be most efficiently achieved through individual study, use of programed materials, and personal counseling by the teacher.
>
> Development of the desire and ability to read all types of literature with understanding and appreciation. The relevance of "native" literature and oral traditions should be recognized, as well as the possible irrelevance of much in classical literature. The achievement of this purpose requires a variety of readily available materials, the articulation of the literature program with other subjects (particularly the social studies), an abundance of time for independent reading, and opportunity for group discussion of the meaning and worth of various literary works.
>
> The formulation of significant ideas which students can express effectively both orally and in writing. Sources of these ideas include the personal experiences of students and the content of other subjects (again, especially the social studies). Students need the opportunity to write, to give prepared talks, and to participate in informal group discussion. Teachers need time to read and to criticize what students write and counsel individual students about their respective problems.

In addition to the English program, the high school should provide opportunity for learning foreign languages, both the conventional

Germanic and Romance languages and the increasingly important Oriental and Slavic languages. These can be learned largely through individual use of programed materials, electronic teaching machines, and independent reading of literature. When several students are studying the same foreign language, they should have the opportunity to converse informally in that language, regardless of differences in achievement levels.

Staffing a foreign language program in the small school might appear to be an unsurmountable problem. Fortunately, two possible solutions are available. One is the employment of a core of specialists who serve several schools on a rotation basis: the "circuit-teacher" plan has been described elsewhere in this report. The second solution is based on current evidence which suggests that a broad foreign language program does not require a specialist in each language taught. One teacher who is competent in one foreign language, who understands the problems of learning foreign languages, and who has adequate materials and equipment at his disposal, can effectively direct the learning of several languages.

In any event, a comprehensive secondary school will afford the opportunity for all interested students to study foreign language. Such a program is educationally feasible in the small school.

Social Studies. A four-year social studies program, for all students, is necessary for the effective assimilation into our American society. A well-planned program will draw appropriate content from a variety of disciplines -- history, anthropology, geography, economics, political science, sociology.

Building upon the background developed in the elementary school, a sequence of learning experiences will seek to help each student:

1) understand the political, social, and economic institutions of our American democratic, private-enterprise political-economic system; 2) appreciate the cultural differences among various peoples of the world which produce legitimately different kinds of political and economic institutions; 3) acquire a knowledge of the history of man in general and of his nation and state in particular; and 4) understand present world problems in light of geographic, historic, cultural, and economic factors.

These purposes will be achieved primarily through wide reading, listening to lectures and viewing films, and taking part in meaningful discussions of significant ideas. The advantages of relating the study of literature, art, and music to the social studies program should be readily apparent.

Mathematics. Since modern technological cultures are founded upon mathematics, every student should develop a functional competence in certain mathematical operations -- e.g., numerical computation, symbolic expression, measurement, graphic representation, and spatial relationships. Most students will have developed their general mathematical skills sufficiently before completing the eighth grade. In the high school, mathematics will be required for only those who are deficient in one or more of these minimum essentials.

A sophisticated and specialized mathematics program should be available for the more able and interested students who plan to attend college or who seek careers in science or technology. This program -- including the conventional courses in algebra, geometry, trigonometry, calculus, mathematical analysis -- may enroll only a small minority of high school students, but for these it is essential.

Most, if not all, objectives of the high school mathematics program

can best be accomplished through individual learning experiences, using programed materials, rather than through more formal large-group instruction.

Science. The general education science program should follow an ecological approach, with special emphasis on conservation, health, simple mechanics, and elementary chemistry. Science in the secondary school might well begin with biology, using the Biological Science Curriculum Study materials adapted to the natural environment of the region served by the school. Physical science could follow, with the scientific principles being related to the local conditions in the initial phase of study.

Students who have the desire and ability should be able to study biology, chemistry, and physics as scientific disciplines. For most, however, science programs should place major emphasis on helping students learn to improve the general hygienic, economic, and cultural conditions of their home communities.

Most learning will take place through reading, viewing films, taking field trips, and experimenting in the laboratory.

Business Education. Business education performs two functions. First, it contributes to the general education of all students through the development of such personal use skills as typewriting and the development of an understanding of the role of the consumer in our American economic system, the structure and operation of American business, and techniques for sound management of personal finances. Second, it is the one program in the small high school which can provide at least minimum occupational training. In addition to such skill courses as shorthand and bookkeeping, general courses in office practice and selling can prepare

students for beginning employment in office and distribution positions.

The business program can also prepare interested students for the fiscal management of individually owned business operations.

The skills typically stressed in high school business education -- typewriting, shorthand, bookkeeping, operation of office machines -- can be taught most efficiently through independent study and practice with the aid of programed materials and suitable equipment, and in far less time than that traditionally allotted.

Industrial Education. Training for specific industrial occupations is impractical in the typical American high school, largely because of the rapidly changing nature of our occupational structure. To be sure, some basic skills can be taught, and these are important for most if not all students, both boys and girls.

More important, however, is the development of understanding of the materials, processes, and products of industry. Specifically, students need to understand our industrial economy and how it differs from various non-industrial economics. They need to understand the place of the individual in the industrial process and the problems of manufacturing and distributing goods in our mass-production economy. They also need to understand the problems of overload costs and the place of small-scale manufacturing, agriculture, and handicrafts in our corporate industrial complex.

To become familiar with the industrial process from raw material to finished product, the student needs manipulative experiences and the opportunity to solve manufacturing problems in the industrial arts laboratory. He should have a variety of raw materials and some modest equipment. The laboratory, however, need not have all the latest models

of power tools. Instruction can take place on an individual basis as effectively as in formally organized classes.

Homemaking. Beyond the basic skills involved in meal preparation and clothing manufacture and repair, the modern homemaker needs an understanding of basic principles of family health and nutrition; the use, maintenance, and minor repair of household equipment; the principles of family budgeting and buying in a "time-payment" society; and the problems of child care and child rearing. Above all, instruction in homemaking must be relevant to the background of the student and the environment in which she lives.

Learning basic skills requires some laboratory equipment, which can be profitably used on an individual problem-solving basis, but the substantive knowledge also will be gained through reading, viewing films, and small group discussions.

The Arts. A distinction must be made between appreciation and performance. Appreciation can best be gained, perhaps, through articulation between the fine arts and the social studies. The part all art forms have played in the life of man can best be understood through studying these art forms in the context of history. By the same token, a study of the history of man is incomplete without consideration of how man has used and enjoyed the arts during various stages of his social evolution. The teaming up of art, music, and social studies teachers may be more productive than separate courses in art history and music appreciation.

Opportunities should be provided, however, for the more interested and able students who desire to perform. Drawing, painting, sculpture, and the various handicrafts require specialized facilities and instruction.

Likewise, both vocal and instrumental music need specialized instruction. The basic performance skills, however, can best be acquired through individual study and practice. The only necessary group activities are rehearsals for performing groups in music.

Instruction in the arts is essential if equal educational opportunity for all students is the goal.

Health and Physical Education. Physical education too often is the athletic program or, in isolated places, basketball. This is completely inadequate. The high school should have a program for all students which will aid their physical development and which will teach them how to maintain physical fitness once they have reached maturity. Such a program requires a variety of activities, suitably planned in terms of the individual's stage of physical growth, which help develop basic motor skills, coordination, agility, balance, and endurance. Equally important, if the program is to have lasting effects each student must develop proficiency in at least one activity which he enjoys. He must also learn to enjoy and benefit from a individual physical fitness program as well as from group games and team sports.

In addition to a sound physical development program, the high school should prepare students for coping with the health problems of modern society. This calls for instruction in first aid, safety, human physiology, diseases and their origins, heredity, mental health, and community health and sanitation. Much of the content of health education can receive attention in regular science and social studies courses rather than in specially designed health education courses. The amount and kind of instruction provided in the high school will depend on the background which students have acquired in the elementary school.

The Environment for Learning

In the small school especially, learning is an active and individual process for the student, characterized by a variety of activity and flexibility in the use of time and space. The teacher's primary responsibilities are the diagnosis of individual student's needs, direction of appropriate individual learning activities, and the evaluation of student progress, not the mere dissemination of information in a formal setting.

Consequently, the total design of the high school facility should create an atmosphere of business-like informality: i.e., it should make both students and teachers feel free to move about and at the same time it should inspire both to approach education in a serious though not somber manner. Liveliness and flexibility, rather than rigidity and sterility, should be designed into the physical structure.

Regardless of the specific content of the curriculum and regardless of the size of the school, component learning spaces must be designed to house six clearly distinguishable types of learning activities. These are briefly described below:

Description	Number of Students	Courses Involved
Passive		
Total group or class: listen-to lectures, watching demonstrations, viewing films, etc.	At any given time, up to 30 per cent of student body	All subjects, but especially language arts, social studies, mathematics, science
Discussion		
Groups of 3-15: face-to-face seating arrangement with writing surface, with or without teacher. Sometimes	At any given time, up to 50 per cent of student body	All subjects, but especially language arts, social studies, mathematics, business, homemaking, health

Description	Number of Students	Courses Involved
Discussion (continued)		
group projects requiring physical activity, are involved		
Study		
Reading, writing, listening to tapes and records, viewing slides and films	At any given time, up to 30 per cent of student body	All subjects, but especially language arts, social studies, mathematics, science
Laboratory		
Scientific experimentation, manipulation of specialized equipment, individual practice	At any given time, up to 30 per cent of student body	Science, business, industrial arts, homemaking, art, music
Physical		
Both individual and group games requiring physical activity	20-50 pupils	Physical education
Counseling		
One-to-one teacher-student conferences	_____	All subjects

These component spaces should be arranged to facilitate flow of students from one type of space to another and to permit optimum supervision of students by teachers at all times.

In addition, space must be designed for the school's entertainment function (music, drama, and athletic performances) and for community social activities. The small high school, particularly, is a center for the community's social (and often political) life. The same space can house all these functions.

General Design Consideration. Each type of space listed above has unique equipment and other physical requirements, and these are detailed below under "Space and Equipment Requirements." Certain common specifications, however, apply to the entire facility, and these are discussed here.

Safety. The fire and safety regulations of the State of Alaska should be stringently complied with. Provision should be made for containing fires originating in any part of the building to the point of origin. Design of fuel storage units must provide for fire protection.

Thermal Environment. The entire facility should be equipped with a system of thermal control -- heating, cooling, and ventilating -- which will handle a temperature range of from 50 to 90 degrees. Even in northern climates, heat rise is the most difficult thermal condition to cope with. A room warm enough to enter soon becomes too warm from light and body heat, calling for immediate ventilation and cooling. Each instructional space should have independent thermal control. Ventilation should not depend on the admission of outside air through windows. Rather it should be forced, appropriately controlled to guard against excessive air movement within. Design of the thermal control system should provide for stand-by capacity. All systems should have interchangeable parts to facilitate maintenance and repair. Generally, fuel oil will be used as the heat source. Storage, designed for protection against extremely low temperatures, should be sufficient to assure a supply for the normal time-period elasping between deliveries plus 30 per cent of normal capacity for contingencies.

Visual Environment. Lighting should provide a glare-free environment of sufficient intensity and quality for close-seeing tasks unless

otherwise specified. Window walls present the major glare problem, and are not recommended. The lighting system should provide for proper brightness ratios and contrasts. The quality and diffusion of interior light should not depend upon the character of external light conditions. If natural light is used, it should not interfere with the desired visual conditions and should be controllable in a practical and efficient manner. The lighting system in all instructional spaces should permit the use of audio-visual aids. Colors should be coordinated within each teaching area. Ceilings should be highly reflective. The floors should provide moderate light reflection; and wall colors should be in soft tones. Throughout the building, the decor should embody hues which improve light reflection and provide variety with compatibility. A satisfactory visual environment is necessary for effective learning.

Acoustical Environment. Spaces should be so designed and arranged that sounds originating in one space do not interfere with activities occurring in another. Deadening sounds at the source, through acoustical treatment of floors, will reduce the need for sound absorption at the ceiling. In fact, reflective ceilings enhance desirable sound transmission.

Utilities. In many locations, schools will have to furnish their own utilities. In such instances, design should provide for transfer to commercial utilities (as they become available) with a minimum of difficulty. Electricity will frequently have to be generated on site. To simplify storage and maintenance, the generator should use the same fuel as the heating system. The generator's capacity should be double the maximum need of the specific building. Generators should have interchangeable parts, and ideally identical models should be used for all schools. Line loads should be computed carefully to maximum

requirements, and 100 per cent additional capacity should be provided in both trunk and feeder lines.

Gas should be provided for science and industrial arts laboratories; it may be desirable for homemaking laboratories as well.

Water storage must guard against extremely low temperatures. Long life hot water tanks should be installed to minimize replacement problems. Water heaters should use the same fuel as the heating and generator systems.

Where appropriate, provision should be made for extending telephone service to future components of the building.

Sanitation. The solution of disposal problems will depend upon the geographic and soil conditions on the school site. Adequate sanitary disposal of waste products must be provided.

The design of restrooms will depend upon the size of the school. Generally, gang toilets (one each for boys and girls) should be provided for every six classrooms, each having three toilets and two lavatories, with two urinals in each boys' room. Areas of the building used after school hours should have access to toilet facilities without opening the entire building to traffic. Doors to restrooms should accommodate two-way traffic and be screened from a direct view of the interior. Lavatories should be installed between the door and toilets, with mirrors being near the lavatories. A floor drain should be installed where it can drain the entire floor surface. Soap, towel, and toilet tissue dispensers and waste receptacles are needed in each restroom. Girls' rooms should contain a sanitary napkin dispenser and separate waste receptacle.

Drinking fountains should be dispersed through the building at the ratio of one for every seventy-five students, with a minimum of two.

One of these should be located near the physical education facilities.

Furnishings. Clocks should be provided at convenient locations, so that every teacher can have a clock in sight; clocks need not be installed in every teaching station. To implement the educational concepts underlying this report -- i.e., education by appointment rather than by alarm -- a schedule bell or tone system is not recommended.

Each teaching station should be capable of receiving television when this becomes available Initial design should permit the subsequent installation of television receivers with a minimum of cost. Outlets should be distributed to permit the proper placement of an adequate number of receivers to serve the maximum number of students to occupy each teaching station. Electrical outlets should also be liberally provided for audio-visual devices.

Wardrobe storage must be provided where each student can place outer garments. Movable storage units, with sliding doors and both front and back surfaces having tackboard or chalkboard, will increase flexibility. Such units can also serve as space dividers within classrooms. Furthermore, students require storage units for books and supplies. Either book lockers or drawers mounted in study carrels will serve this purpose.

Tackboards and reflective chalkboards should be provided in all instructional spaces, adjustable in height and interchangeable with map rails at the top. Few, if any of these, should be "built-in." Also, every teaching station should have projection screens, designed to eliminate the Keystone effect when used for front-of-the-room projectors. Rear-screen projection units and other types of audio-visual consoles eliminate the need for permanently installed screens. When movable,

these units also eliminate the need for a screen in every teaching station, although these units should be supplied in sufficient quantity to minimize schedule conflicts.

All classroom furniture should be movable. Student chairs and tables will be arranged in a variety of patterns. These should be light weight and easily stacked for storage. Book and magazine racks and supply storage units in the classroom should also be movable.

Because of high transportation costs, storage capacity should be adequate for a full year's supply of all items needed for operation and maintenance. All items should be of standard brands for quick procural of parts or replacements.

Special Facilities

In addition to the instructional spaces designed to house the various learning activities described above, all but the smallest high schools should have special provisions for teacher planning, administration, and library services.

Teacher Planning. Space should be provided where teachers can prepare materials for classes and counsel students in quasi-privacy. This space should be easily accessible to instructional areas and to the library. Each space should have a teacher's desk and chair, a visitor's chair, book shelving, and four-drawer file. The planning area should contain a work counter with storage for miscellaneous supplies.

Administration. A reception area, readily accessible from both the outside and interior of the building, should be designed to achieve a feeling of openness. When needed, faculty mail boxes and a bulletin board should be located here. A clerical work station can be separated from the reception area by a work counter. School records should be

stored where they can be easily reached by all authorized personnel. The clerical space should contain a secretary's desk and chair, typewriter, duplicator, small work table, and file cabinets.

The administrator's office should have convenient access from both the reception area and clerical work station. The office should contain a desk and chair, three comfortable visitors' chairs, file cabinet, book shelves, and coat closet.

The record area will contain filing cabinets for housing current personnel records. A fire-resistant vault could provide storage for inactive files as well as for current records when not in use.

Space should also be provided for both individual and small-group counseling and testing. Several counseling or testing situations may take place concurrently. This space will be used by all professional personnel for their counseling activities.

Library. In addition to housing all kinds of instructional materials -- books, periodicals, disc and tape records, films, slides, and other programed materials -- the library is the center for individual study and independent research. It houses the heart of the educational program. Consequently, it should be centrally located in the school plant, readily accessible from all other instructional spaces.

The circulation desk and card catalog should be near the entrance. The book stacks should be easily reached by all students and teachers. Small reading tables (accommodating 4-6 students each) and study carrels (enough to accommodate 30 per cent of the student body) should have ready access to the stacks. A browsing corner, with periodical racks and informal seating for a half-dozen students, should be somewhat separated from the main reading area.

A workroom-office should be located near the circulation desk, permitting supervision of the main reading area. This will contain a desk, chair, typewriter and stand, work counter, standard card catalog, legal size vertical file, and flat storage drawers. A storage room should open from the workroom, having ceiling-height adjustable shelving. Book trucks and equipment carts should be provided for moving materials between the library and classrooms.

The number of volumes to be housed will depend to some extent on the school's enrollment, although a comprehensive educational program will require 4,000-6,000 titles in even the smallest school.

Space and Equipment Requirements

The rural high school is expected to enroll between 25 and 150 students. Obviously, the space requirements differ substantially for the two extremes. Furthermore, a school initially designed for twenty-five may subsequently expand to fifty, one for fifty may grow to seventy-five, and so on.

Because a uniform set of recommendations cannot apply to all size categories, even within this limited enrollment range, and because any design concept must accommodate future growth, an attempt is made here to develop a plan which will permit orderly expansion for each of six successive enrollment increments of twenty-five students.

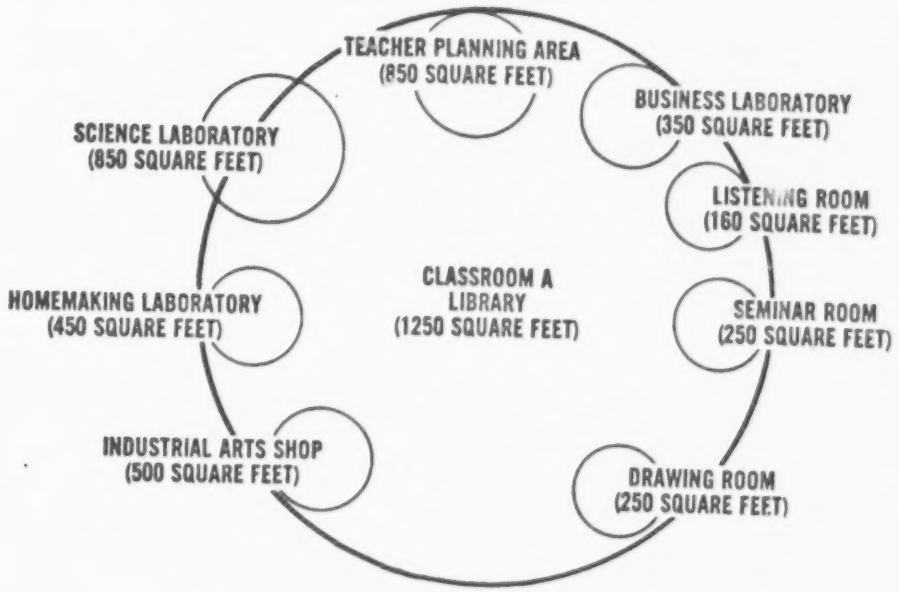
For each increment, the recommended space and equipment allocations are adequate for the designated enrollment. These recommendations are based on the educational program and the approach to the teaching-learning process described above. They are based further on the assumption that the high school will be located near an elementary school, preferably on the same site. The schematics are just what the

name implies -- illustrations of desirable space relationships. In no sense are they intended to suggest the actual shape of learning spaces.

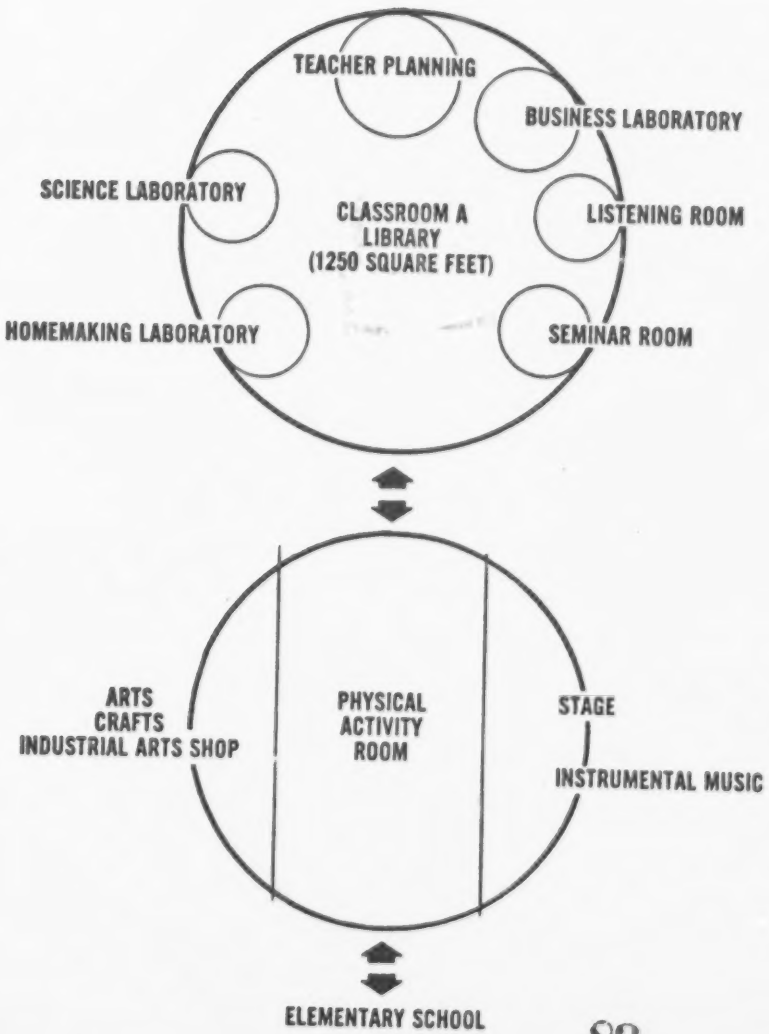
For up to twenty-five students. This will be a two-teacher school. The physical education program could be housed in the multi-use room of the elementary school, described in an earlier section of this report. Music group rehearsals can take place on the stage of the multi-use room. The basic component of the high school will be one general purpose classroom in which all total class instruction will take place. This room will also house the library. Specialized laboratories, seminar rooms, and teacher planning area will open off this room.

SUGGESTED SPACE AND EQUIPMENT ALLOCATIONS

Area	Square Feet	Equipment
Classroom-library	1,250	Seating for 25 students at 30 sq. ft., perimeter for books and periodicals, six individual study carrels.
Teacher planning area	700	Desks and chairs for two teachers, workroom record storage. Duplicating facilities in this room.
Science laboratory	400	Stations for five students using laboratory independently, storage for supplies. Glass cases for models and specimens. Equipment includes incubator, balances, pressure cooker, centrifuge, aquaria and terraria, microscopes, and other laboratory equipment.
Shop	500	Stations for five students using shop independently. Equipment includes bench lathe, drill press, grinder, 2 woodworking benches, 2 metal-working benches, and one electronics bench. Crafts activities will take place in this room.
Drawing room	250	Chairs and tables for 5-10 students.
Seminar room	250	Chairs and tables (capable of being grouped together) for twelve students.
Listening-viewing room	160	Chairs for eight students, with tape recorder and headsets, table model screens and projectors, teaching machines.
Business laboratory	350	Chairs for five students, 5 L-shaped desks with typewriters, file cabinet adding machine, calculator, dictaphones.
Homemaking laboratory	450	One kitchen unit, two sewing machines, one cutting table, small appliances
TOTAL	4,310	

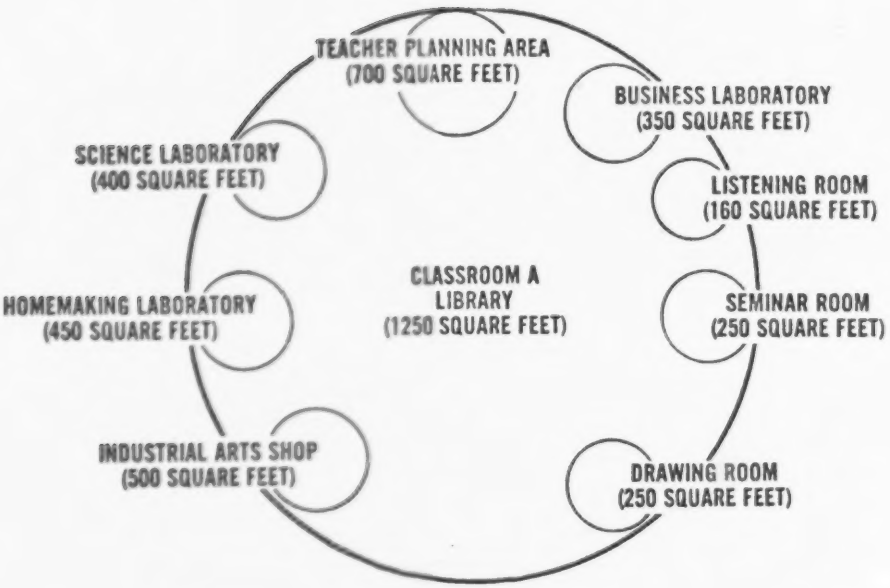

TEACHER PLANNING AREA
(850 SQUARE FEET)
BUSINESS LABORATORY
(350 SQUARE FEET)
SCIENCE LABORATORY
(850 SQUARE FEET)
LISTENING ROOM
(160 SQUARE FEET)
CLASSROOM A
LIBRARY
(1250 SQUARE FEET)
HOMEMAKING LABORATORY
(450 SQUARE FEET)
SEMINAR ROOM
(250 SQUARE FEET)
INDUSTRIAL ARTS SHOP
(500 SQUARE FEET)
DRAWING ROOM
(250 SQUARE FEET)

or

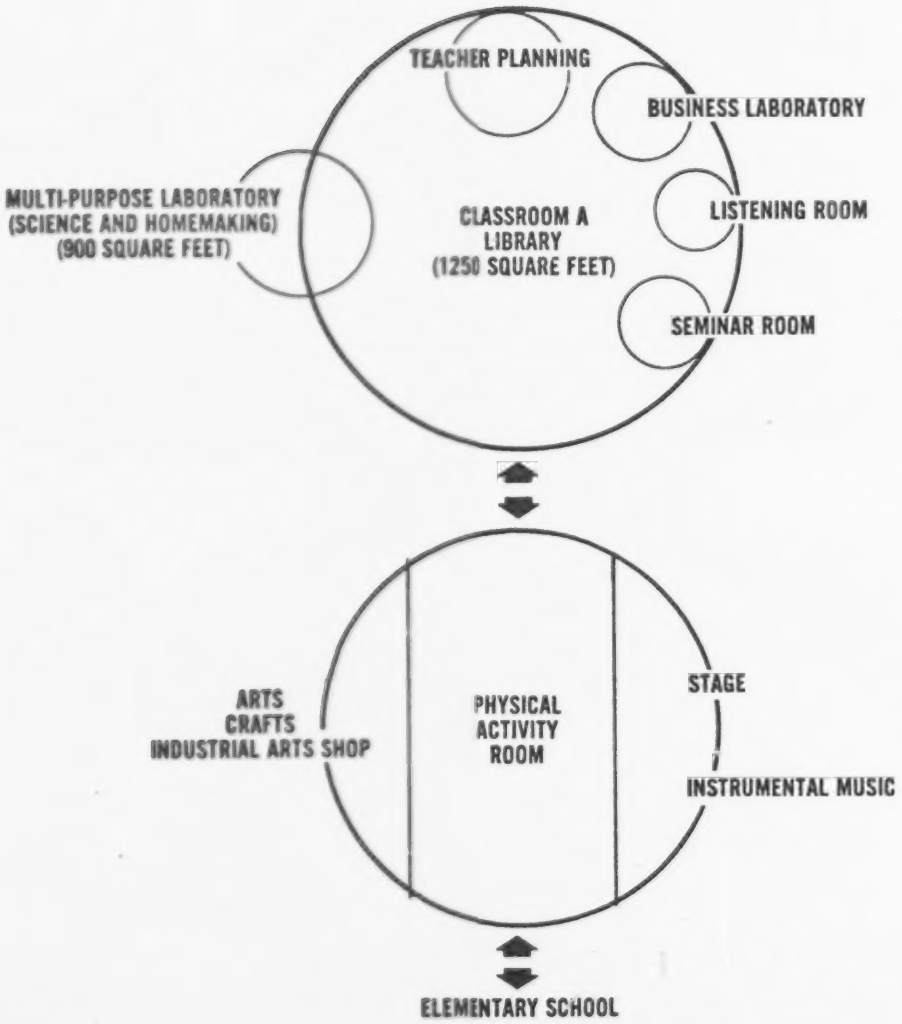

TEACHER PLANNING
BUSINESS LABORATORY
SCIENCE LABORATORY
CLASSROOM A
LIBRARY
(1250 SQUARE FEET)
LISTENING ROOM
HOMEMAKING LABORATORY
SEMINAR ROOM
ARTS
CRAFTS
INDUSTRIAL ARTS SHOP
PHYSICAL
ACTIVITY
ROOM
STAGE
INSTRUMENTAL MUSIC
ELEMENTARY SCHOOL

For fifty students. The plan described above for twenty-five students contains seventy-six student-stations. At sixty-seven per cent utilization, they would suffice for fifty students. Additional space for discussion activities can be provided through rearrangement of furniture in the classroom-library. The science laboratory should be expanded by the addition of a Lewis-type individual study center.[1] If a third teacher were added, additional planning space would be needed. A total of 4, 910 square feet (600 square feet additional space) would accommodate the expanded enrollment. The revised schematic would appear as shown on the following page.

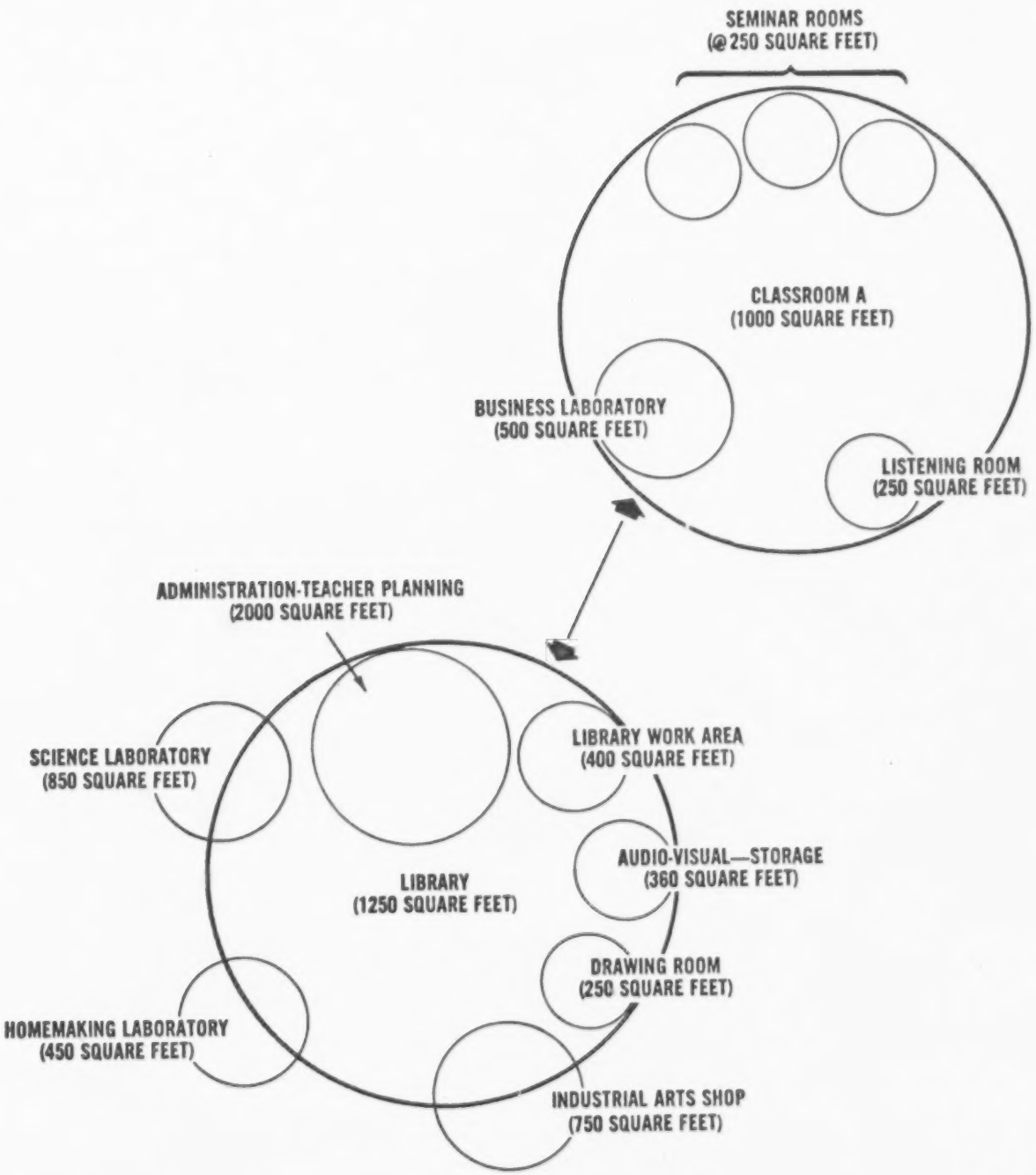
[1] Patented by Robert Lewis and described in Designs for Small High Schools, an Educational Facilities Laboratories publication.


TEACHER PLANNING AREA
(700 SQUARE FEET)
BUSINESS LABORATORY
(350 SQUARE FEET)
SCIENCE LABORATORY
(400 SQUARE FEET)
LISTENING ROOM
(160 SQUARE FEET)
CLASSROOM A
LIBRARY
(1250 SQUARE FEET)
HOMEMAKING LABORATORY
(450 SQUARE FEET)
SEMINAR ROOM
(250 SQUARE FEET)
INDUSTRIAL ARTS SHOP
(500 SQUARE FEET)
DRAWING ROOM
(250 SQUARE FEET)

or

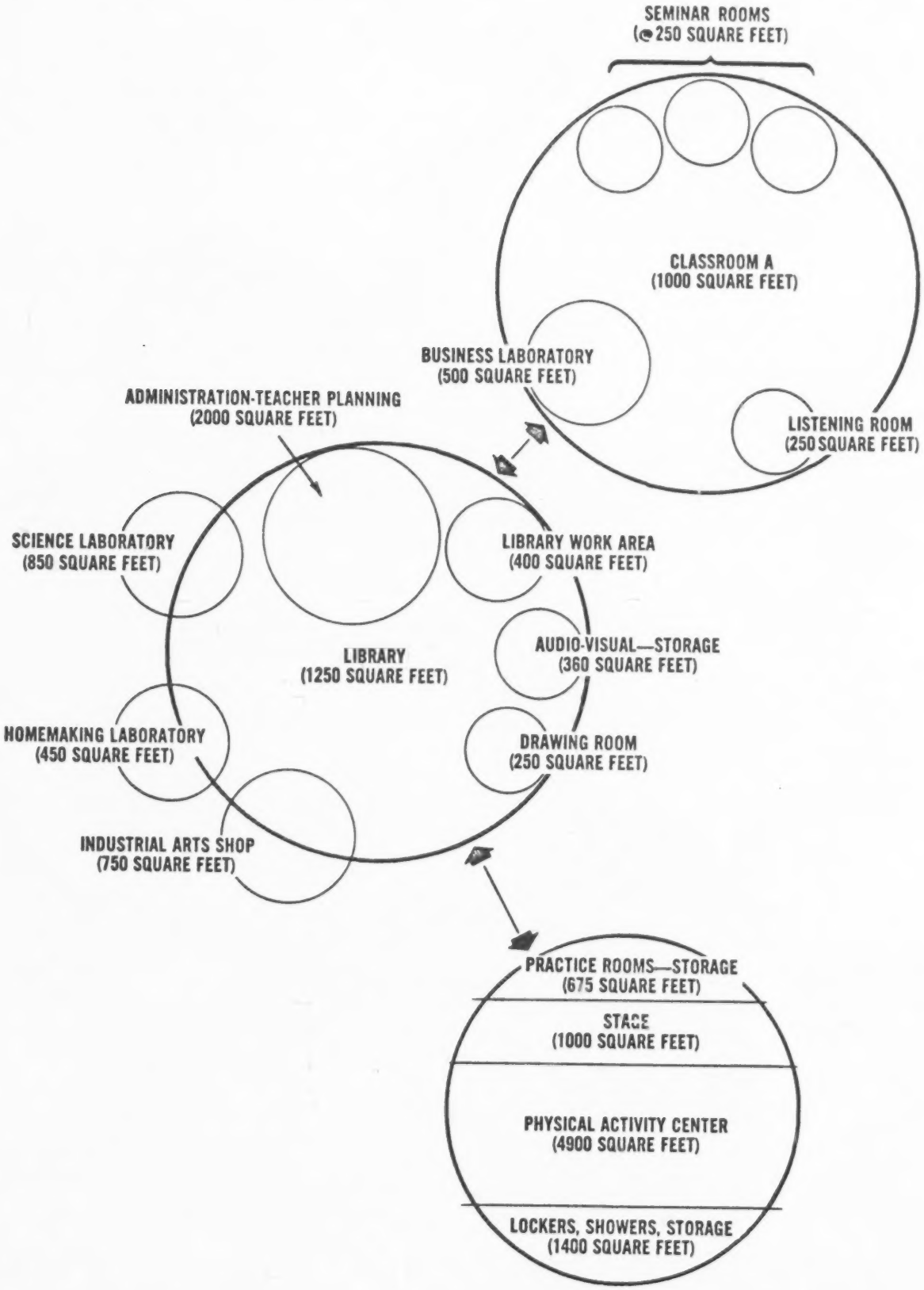

TEACHER PLANNING
BUSINESS LABORATORY
MULTI-PURPOSE LABORATORY
(SCIENCE AND HOMEMAKING)
(900 SQUARE FEET)
CLASSROOM A
LIBRARY
(1250 SQUARE FEET)
LISTENING ROOM
SEMINAR ROOM
ARTS
CRAFTS
INDUSTRIAL ARTS SHOP
PHYSICAL
ACTIVITY
ROOM
STAGE
INSTRUMENTAL MUSIC
ELEMENTARY SCHOOL

For seventy-five students. At this point an additional unit would be added, including a general purpose classroom with seminar rooms and auxiliary laboratories. The original classroom could become a more specialized library with work area, stacks, and independent study carrels for twenty-five students, as well as audio-visual room. The shop and business laboratory will be expanded. A full administrative unit would be provided, including office, clerical area, workroom, records storage, and conference area. The total complex would contain 120 student-stations and 8,810 square feet of space. The plan would be expanded as shown on the following page.

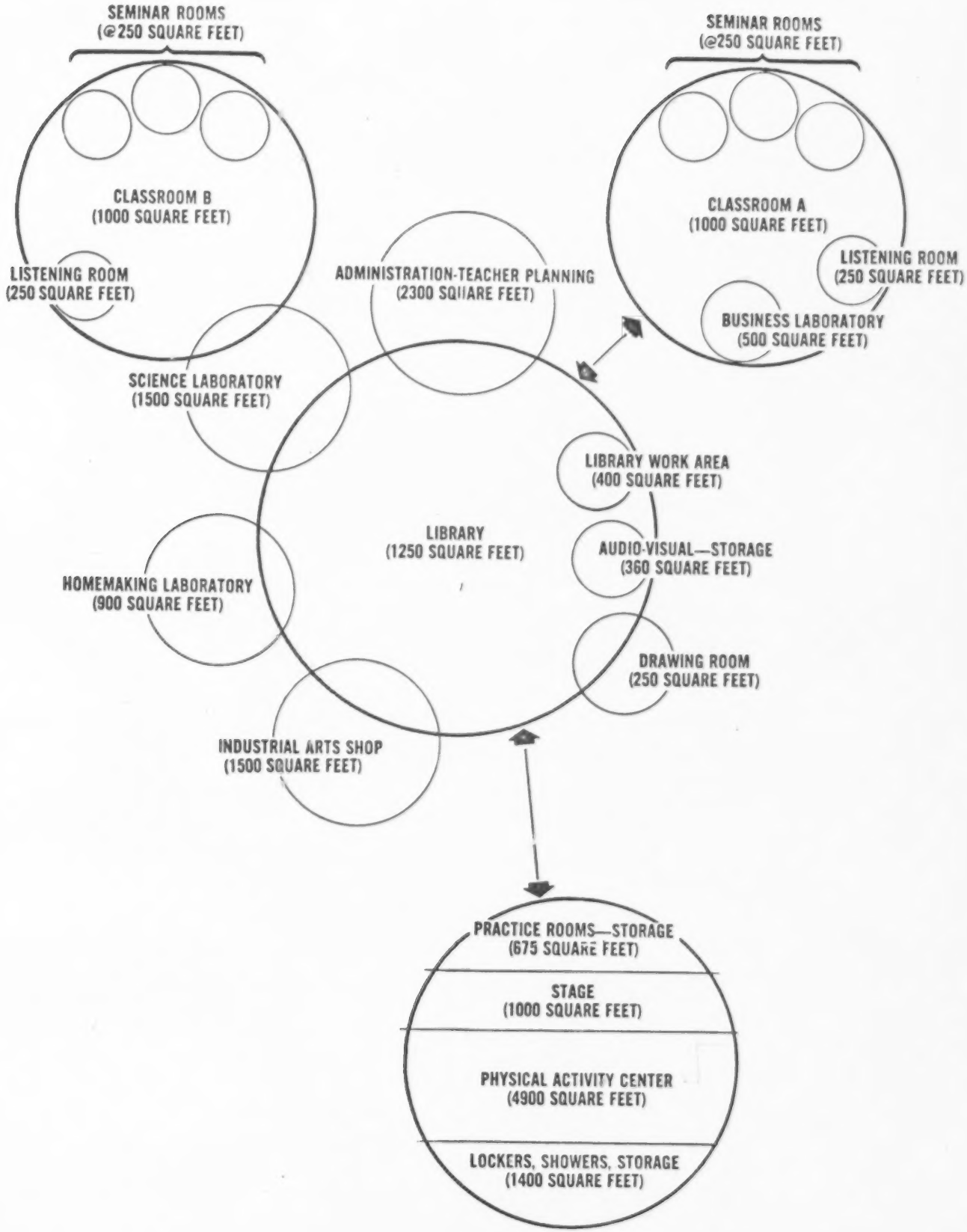

SEMINAR ROOMS
(@250 SQUARE FEET)
CLASSROOM A
(1000 SQUARE FEET)
BUSINESS LABORATORY
(500 SQUARE FEET)
LISTENING ROOM
(250 SQUARE FEET)
ADMINISTRATION-TEACHER PLANNING
(2000 SQUARE FEET)
SCIENCE LABORATORY
(850 SQUARE FEET)
LIBRARY WORK AREA
(400 SQUARE FEET)
AUDIO-VISUAL—STORAGE
(360 SQUARE FEET)
LIBRARY
(1250 SQUARE FEET)
DRAWING ROOM
(250 SQUARE FEET)
HOMEMAKING LABORATORY
(450 SQUARE FEET)
INDUSTRIAL ARTS SHOP
(750 SQUARE FEET)

For 100 students. No additional instructional space would be needed, but a multi-use room should be added. This would consist of a physical activity area and a stage which could accommodate the music program and the school lunch program. Practice rooms adjacent to the stage would serve as dressing rooms for school dramatic productions.

The stage and auxiliary spaces would contain 1,675 square feet. The physical activity center, housing two teaching stations and accommodating team sports, would require approximately 6,300 square feet of space. The new plan containing 16,785 square feet would appear as shown on the following schematic.


SEMINAR ROOMS
(@250 SQUARE FEET)
CLASSROOM A
(1000 SQUARE FEET)
BUSINESS LABORATORY
(500 SQUARE FEET)
ADMINISTRATION-TEACHER PLANNING
(2000 SQUARE FEET)
LISTENING ROOM
(250 SQUARE FEET)
SCIENCE LABORATORY
(850 SQUARE FEET)
LIBRARY WORK AREA
(400 SQUARE FEET)
AUDIO-VISUAL—STORAGE
(360 SQUARE FEET)
LIBRARY
(1250 SQUARE FEET)
HOMEMAKING LABORATORY
(450 SQUARE FEET)
DRAWING ROOM
(250 SQUARE FEET)
INDUSTRIAL ARTS SHOP
(750 SQUARE FEET)
PRACTICE ROOMS—STORAGE
(675 SQUARE FEET)
STAGE
(1000 SQUARE FEET)
PHYSICAL ACTIVITY CENTER
(4900 SQUARE FEET)
LOCKERS, SHOWERS, STORAGE
(1400 SQUARE FEET)

For 125 to 150 students. Another classroom unit would be added, surrounded by seminar rooms, a second listening room, teacher planning area, and auxiliary science laboratory. At this point the industrial arts and homemaking laboratories would be expanded to accommodate 15-20 students respectively. The expanded plan would contain 20, 935 square feet of space and 231 student-stations, the latter exclusive of music and physical education. Schematic 5 represents this total plan.


SEMINAR ROOMS
(@250 SQUARE FEET)
CLASSROOM B
(1000 SQUARE FEET)
LISTENING ROOM
(250 SQUARE FEET)
SEMINAR ROOMS
(@250 SQUARE FEET)
CLASSROOM A
(1000 SQUARE FEET)
LISTENING ROOM
(250 SQUARE FEET)
BUSINESS LABORATORY
(500 SQUARE FEET)
ADMINISTRATION-TEACHER PLANNING
(2300 SQUARE FEET)
SCIENCE LABORATORY
(1500 SQUARE FEET)
LIBRARY WORK AREA
(400 SQUARE FEET)
LIBRARY
(1250 SQUARE FEET)
AUDIO-VISUAL—STORAGE
(360 SQUARE FEET)
HOMEMAKING LABORATORY
(900 SQUARE FEET)
DRAWING ROOM
(250 SQUARE FEET)
INDUSTRIAL ARTS SHOP
(1500 SQUARE FEET)
PRACTICE ROOMS—STORAGE
(675 SQUARE FEET)
STAGE
(1000 SQUARE FEET)
PHYSICAL ACTIVITY CENTER
(4900 SQUARE FEET)
LOCKERS, SHOWERS, STORAGE
(1400 SQUARE FEET)